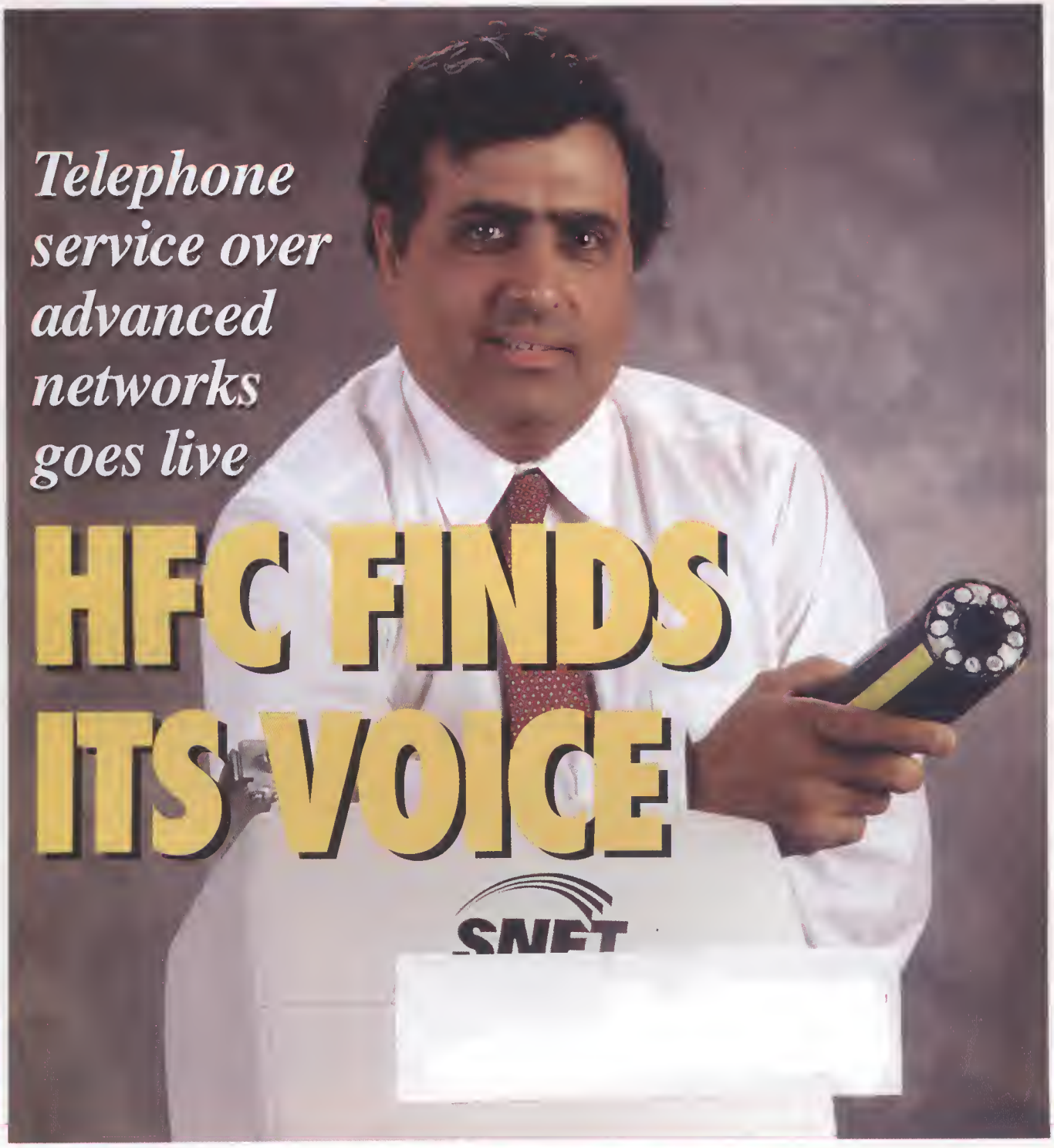
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America's Network

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I(T'S) S(ERIOUS) D(ATA) N(OW)

It's time for a tribute to those public network providers who have broken through the vapor barrier on getting out ISDN services. According to our lead Technology Focus story by contributing editor Mark Dziatkiewicz, ISDN now is readily available across the country, with most RBOCs boasting more than 80% availability. While there are some considerable headaches still associated with provisioning ISDN, the good news is that it is no longer a phantom service. And certainly the provisioning and configuration headaches are no greater than those caused by trying to obtain even dial-up Internet access only a few years ago.

But once ISDN catches fire in the public's mind, when there is a buzz created about its benefits, it is likely to whet corporate and consumer appetites for bandwidth faster than most providers now realize. Hot technologies tend to swamp supply lines fast. So now that switches are getting ISDN-equipped, and prices are starting to fall, watch out.

Certainly some problems remain in making ISDN a commercial-grade, much less a consumer-level, service. I think one of the most serious marketing impediments is the language used by providers to tell customers the ISDN story. Here's a tip: Don't chat up PPP-compatible terminal adapters, switch specifications and 2B+D on the first call. Keep it in the background. Rather, focus the pitch on these six simple words: Internet, Internet, Internet, speed, speed, speed.

One way to keep the technical headaches from overwhelming your customers is to start bundling services with ISDN. Eventually, you may not even have to mention ISDN, much less the dreaded terminal adapter, at all.

Again, don't say, "We can link up two B channels for you." Simply say, "You'll be able to surf the Net 10 times faster than you can with your modem." Some prescient service providers already are starting to do this, with what I believe will be tremendous results. After all, as our story points out, the Internet largely has driven ISDN through to its current level of popularity. So why not dance with the one that brung you?

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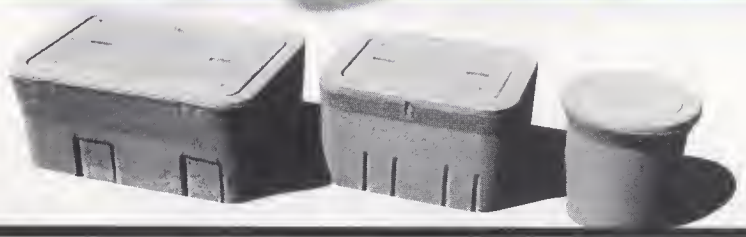
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MOBILE DATA'S SUCCESS DEPENDS ON BRIDGING TECHNOLOGY GAP

Stephen A. Virostek

It's hard being on the forefront of wireless communications—mostly because nearly everyone else is playing catch-up. With the mobile data industry, customers often are dazed and confused by the "technology gap" when all they really want to know is how this new technology will affect their business. The success of mobile data, in large part, depends on how well the benefits (lower costs, increased productivity, ease of use and increased customer service) are articulated to future customers.

Dazed and Confused

Despite the popularity of wireless communications, advances of the Information Age and growth of on-line information services, the wireless data industry remains in a rudimentary stage—serving approximately 1 million subscribers and generating less than $280 million in service revenues during 1995.

EARLY SUCCESSES

A new market study by MTA-EMCI finds that mobile data providers have had limited success in penetrating the market for two-way wireless data services. Despite the popularity of wireless communications, advances of the Information Age and growth of on-line information services, the wireless data industry remains in a rudimentary stage—serving approximately 1 million subscribers and generating less than $280 million in service revenues during 1995. While annual subscriber growth rates exceed 25%, the current number of mobile data users represents less than 4% of two-way mobile communications users and 1% of the U.S. workforce. Industry successes have been limited to one mobile satellite operator, the specialized mobile radio (SMR) industry and the cellular industry.

Led by Qualcomm's OmniTRACS service, mobile satellite operators will serve more than 130,000 mobile data subscribers by yearend 1995, earning more than $100 million in service revenues. Qualcomm has achieved a leadership position by being first in the market with an end-to-end service tailored for the trucking industry. Applications include position reporting, vehicle monitoring and automated billing services.

Specialized mobile radio operators, with their focus on business communications services, have developed a few key mobile data applications that are used by more than 100,000 subscribers, or approximately 5% of the entire SMR industry. Leading applications for SMR subscribers include automatic vehicle location, facsimile and automated scheduling.

Cellular carriers have experienced limited success in attracting circuit-switched users. Surveys show that approximately 3% of cellular subscribers use a modem to send and receive data over the cellular network. Many of these customers have put together their own solutions for telemetry, facsimile and database query applications. The good news for the cellular industry is that mobile data use has grown in spite of the difficulties of circuit-switched transmissions and limited hardware and service offerings. Most potential data users do not have the capital resources or business clout of United Parcel Service (UPS), which organized more than 90 cellular carriers into a nationwide circuit-switched data solution. Today, approximately 55,000 UPS vehicles access delivery information on more than 6 million UPS packages daily.

FUTURE OF MOBILE DATA

MTA-EMCI's analysis of the U.S. workforce yielded a mobile data market potential of 13 million workers, approximately 11% of the entire U.S. workforce. Some of the largest occupational groups are trucking and warehousing, insurance agents and social services.

Before projecting which wireless operators will serve these occupations, we analyzed the competitive position of providers with respect to existing subscriber bases, coverage areas, in-building penetration and the economics of sending short vs. long data files. This analysis also assesses marketing capabilities of the different service providers. The providers who effectively communicate the benefits of their services and who provide sterling customer service will succeed in this marketplace.

MTA-EMCI determined that cellular, SMR and two-way paging service providers best met the above criteria. Cellular providers will offer a multitude of data options over circuit-switched and packet-switched networks, although the success of CDPD still is questionable. Digital SMR operators are introducing sophisticated voice and data applications for mobile workgroups. Two-way paging operators will use their marketing savvy and wide area distribution to penetrate the market with a low-cost, simplistic mobile data solution for existing and new customers. These operators should bridge the technology gap over the next five years, propelling the mobile data market to 5.2 million subscribers by the year 2000. ■

Stephen A. Virostek is director-mobile data research for D.C.-based consultancy MTA-EMCI.



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ISDN NOT AS SIMPLE AS 2B+D; WHAT YOU SEE NOT WHAT YOU GET

Mark Dziatkiewicz, Contributing Editor

Looks like a duck, walks like a duck, must be a duck. But matters aren't as straightforward with ISDN's 2B+D. What you see isn't always what you get.

2B+D represents ISDN's service deliverables. It's what subscribers receive over their twisted-pair copper loop. The "B" channels are "bearer" channels, "typically used to transport the user's data or an actual voice call," explains Victor Holland, engineering manager for Motorola's Transmission Products Division. At 64 kbps each, the combination offers unprecedented data transmission capability compared with analog modems.

The "D" channel is icing on ISDN's cake. "It's a special channel between the terminal adapter and central office for call management and set-up," Holland continues. Commonly referred to as out-of-band signaling, the D channel communication link is the brains of the operation. "There's also a packet service available on the D channel, but it's not commonly used because it has to be made available in the central office switch."

Pumping 2B+D into businesses and homes is a good start, but it's nothing more than unintelligible ones and zeros without the terminal adapter. "Terminal adapters are pieces of CPE gear that basically adapt whatever existing equipment there is, such as a PC or 2500-series telephone, to your ISDN line," says Holland.

Terminal adapters act as translators for analog telephone sets by converting digital voice to analog. Performed at the customer premises, this adapter function replaces a central office line card. "When doing digital data, [terminal adapter] is changing the data stream to a different protocol mode to be transported through the network," he clarifies.

What's That You Say?

Northern Telecom and AT&T implemented ISDN, but they didn't speak the same language. Message streams that travel back and forth on the D channel are different and not compatible with each other. It's like speaking English but with a British accent.

DIFFERENT DIALECTS

These adaptation functions are critical to ISDN because 2B+D doesn't always look the same. "Terminal adapters have to know what kind of central office switch they're attached to," he continues. "Northern Telecom and AT&T implemented ISDN, but they didn't speak the same language. Message streams that travel back and forth on the D channel are different and not compatible with each other." This issue has complicated and handicapped ISDN's market success significantly. "It's like speaking English but with a British accent. They're both doing ISDN but have different dialects."

ISDN's 2B+D channels function differently as well, depending on configuration and services supported. ISDN lines have SPIDs (service profile identifiers) to keep track of service differences. "It's a code transmitted from your terminal adapter to the central office switch—it happens once at power up," Holland explains. "It's used as a look-up in a database to know what services are available on that ISDN line. It's transmitted when the line is established, but the central office and terminal adapter are continuously talking to each other."

In addition to SPIDs, terminal adapters store directory numbers (DNs). Each ISDN line has two DNs corresponding to its two B channels. "It's basically your seven-digit telephone number. You put it in the equipment because terminal adapters have the capacity to support several telephone numbers," he says. "The central office transmits that a call is coming to you so the terminal adapter can direct it and have the right device respond. It's like specifying where the call is bound."

How channels function is another 2B+D differentiator and depends on feature sets. "Sometimes features are part of baseline ISDN, and other times they're options," he says. These differences vary by network operator and include call waiting, caller ID and others.

Holland also notes the difference between multiple call numbers and multiple call appearances. ISDN lines come with the former but must be equipped for the latter. "It has two POTS lines and they're independent of each other—two different phone numbers," he says. "But if you're on the first port and someone else decides they want to call you at the same number, the CO says it's busy unless [the line] has multiple call appearances. With multiple call appearances, you get the tone."

Terminal adapters perform other functions, adding to—instead of merely translating—ISDN's capability. Rate adapting PC data is a good example. "Rate adaptation protocols are translators that take data out of the PC and adapt it to the 4 kbps data stream to transport it through the network," says Holland. "It's taking async data rates and putting it on an ISDN line."

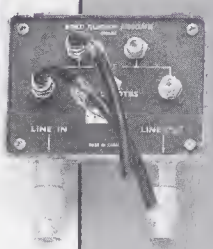
Two bearer and one data channel. They don't quack, but when it comes to ISDN 2B+D, there's certainly more than meets the eye. ■

OUR GROMMETS WITHSTAND THE TEST OF TIME

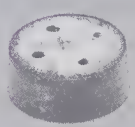
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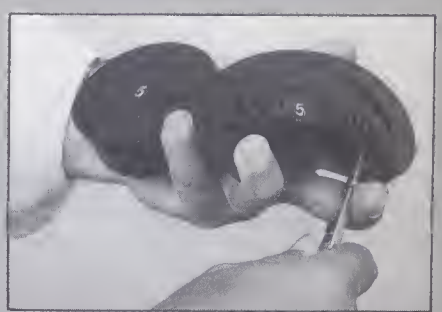






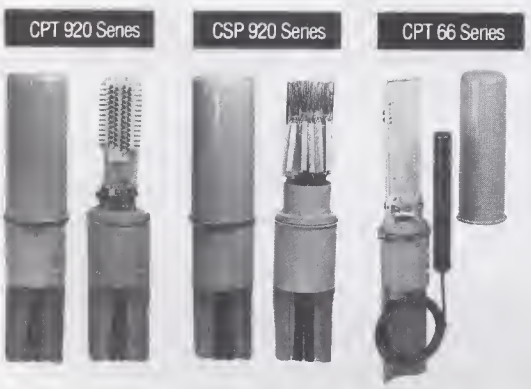


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WHERE'S STILLS?

Patty Wetli
Associate Editor

Wait till Sinatra gets a load of this. Singers Graham Nash and David Crosby (sans partner Stephen Stills) crooned a few duets for the audience at AT&T's "Success in Cyberspace" conference—with Nash in Atlanta's Symphony Hall and Crosby in a California studio.

No smoke and mirrors, the trick was accomplished using Alcatel's Switched Digital Video Network (SDVN) and a handoff between AT&T and BellSouth. A high-definition video codec captured video and audio of Crosby, which was transmitted across the public network and beamed into Symphony Hall, where Nash performed in person.

Crosby popped up on "surround-type of screens," according to Alcatel spokesperson Michael Newsom. "It was like he was really there."

The concert was part of a demonstration to show the potential of larger-scale virtual events. Using 45 megabits, "this blows teleconferencing away," Newsom says. More than just high-definition video, SDVN offers enough bandwidth to enable applications such as MPEG-2 cable TV and live, interactive video editing.

But Newsom notes all these services have one thing in common: entertainment. The company is going Hollywood with SDVN, hoping to create a business case for others. "The entertainment industry is the tail that wags the dog."

SNOOZING ALONG

We knew it. For years, telecommuters have told their office-bound peers that working at home makes them more productive, with fewer distractions around to break their concentration. And we believed them—Not.

They're hitting the snooze button and watching "Oprah." Or they'd like to be. According to a recent survey by AT&T/Roper Starch, many commuters say they need more sleep. So given shorter drives into work, what would telecommuters do with the extra time?

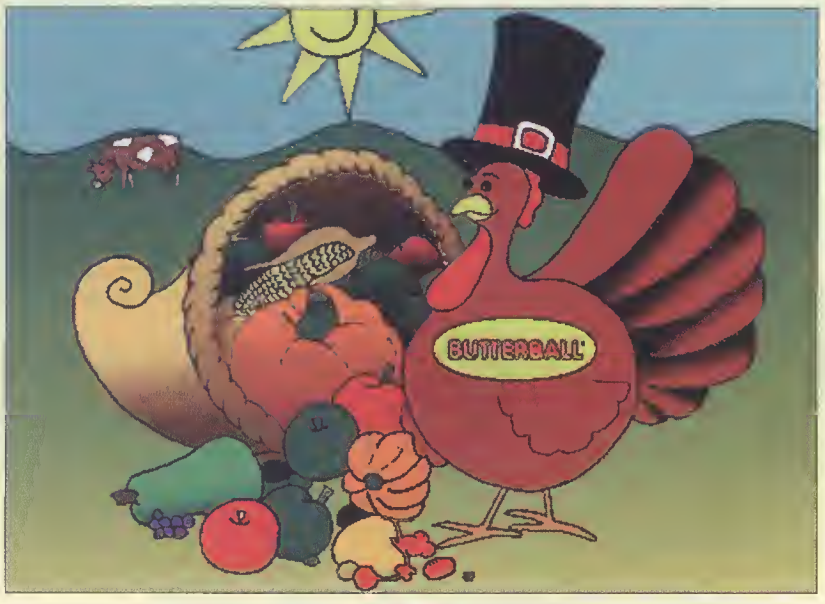
At least 36% said they would "recharge themselves with more sleep, rest and relaxation." ■



TALKING TURKEY

Just in time for the holidays, Butterball is sending its turkeys into orbit. At http://www.butterball.com, specially-trained home economists will be on line in November and December to talk visitors through their turkey traumas.

Information at the site includes Butterball's vision of the picture-perfect Thanksgiving dinner (giblets optional) and plenty of tempting recipes for those sumptuous leftovers. Despondent chefs can e-mail staffers from Nov.1-18 and Nov. 24-Dec. 22. During those critical moments of Thanksgiving week, Nov. 19-23, the company is promoting a more traditional mode of communication. It's called the telephone: 800-323-4848.



DUELING DIRECTORIES

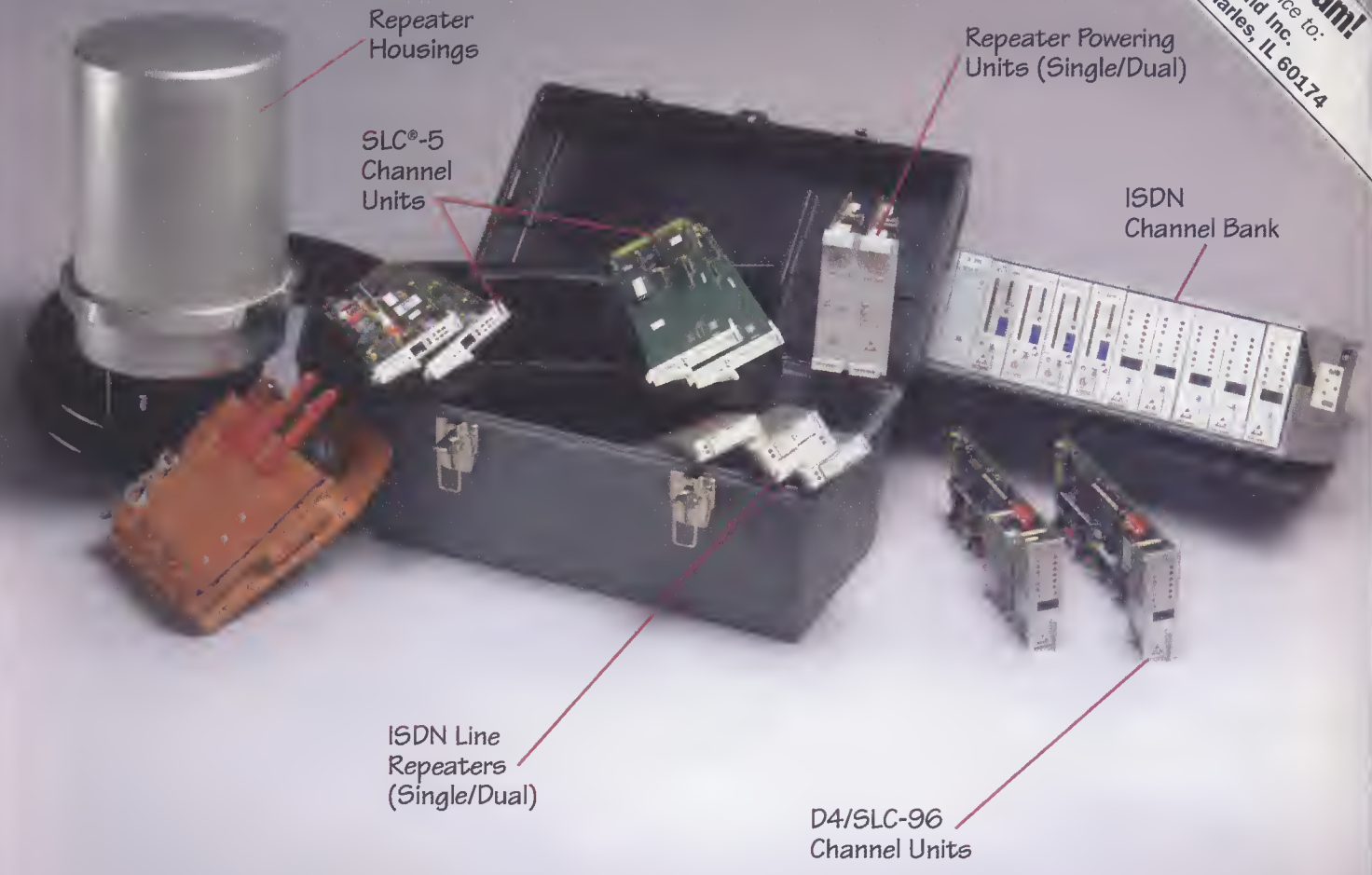
Remember when you could let your fingers do the walking? You still can if you use your computer keyboard—two new directory offerings on the Net go far beyond the reaches of your local plumber.

Nynex Interactive Yellow Pages (http://www.niyp.com) includes 16.5 million business listings from across the U.S. Advertising units range from brief business profiles for $100 to four pages of display advertising for about $3000. Businesses also have the option of linking their listing to their own Web sites.

On the other coast, California-based World Yellow Pages Network (wyp.net) has loaded the entire U.S. yellow pages onto the Web and given every business a free Web page, which they can update at any time. Not completely selfless, the World Yellow Pages Network also is a Web development company.

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Circle 134

COMPETITORS QUESTION AT&T'S NEW NON-DOMINANT STATUS

Deborah Eby
Washington Editor

AT&T officially is now a "non-dominant" domestic interexchange carrier, subject to most of the same regulations that govern its IXC competitors.

Some hail the FCC's "landmark" decision dissolving AT&T's dominant status as recognition of a competitive long distance market where no carrier can manipulate prices or take market share for granted. Others suggest a politically cowed FCC, fearing for its own survival, has hopped on Washington's deregulation bandwagon.

"We supported the FCC's wise, gradual deregulation of AT&T as circumstances warranted on a market-by-market basis," says James Smith, president of the Competitive Telecommunications Association (CompTel). "Now, in order to yield to political pressure to deregulate no matter what the merits, the FCC has deregulated AT&T entirely."

NOT MOLLIFIED

Smith is not mollified by the slew of commitments AT&T made to win non-dominant status, even though the items are written into FCC rules. They include special rates for low-volume and low-income callers, special notice when tariffs include deaveraged rates or affect long distance resellers and large customers, and a pledge to enter into arbitration to settle reseller disputes.

Despite these provisions, the FCC is giving away its ability to scrutinize AT&T's market behavior, warns Smith. The carrier will be able to file most tariffs on one day's notice rather than 45 and no longer need submit volumes of cost justification.

The FCC granted such freedom while the carrier still has 80% of the operator services market, 75% of payphones and a string of past tariff suspensions for refusing to give resellers the same terms and conditions as large business customers, laments Smith. He adds that AT&T still represents 60% of LECs' access business and has the clout to extract preferential prices.

WE SUPPORTED THE FCC'S WISE, GRADUAL DEREGULATION OF AT&T AS CIRCUMSTANCES WARRANTED ON A MARKET-BY-MARKET BASIS. NOW, IN ORDER TO YIELD TO POLITICAL PRESSURE TO DEREGULATE NO MATTER WHAT THE MERITS, THE FCC HAS DEREGULATED AT&T ENTIRELY.

All this spells difficulties for small and medium-sized IXCs, especially resellers, who rely on AT&T as one of their primary sources. "To the extent that AT&T gets better deals unjustifiably based on its market advantages, I'm concerned it will diminish competition—especially price competition—among long distance carriers," Smith says.

"You can always file a complaint," he concludes, "but I will tell you honestly that complaints are not worth the paper they're written on because it takes the FCC four or five years to ever get to them."

COMPETITION AS CURE

But some industry observers believe deregulation was the right way to go; competition actually may cure market ills in the IXC industry. AT&T's new status is unlikely to trigger higher rates, according to Brian Adamik, director-consumer communications for the Yankee Group.

"They're certainly not going to raise rates frivolously," he says. "There's plenty of choice in the consumer long distance market today, and if consumers are dissatisfied with one carrier, they can very easily choose another one." He adds that one way or another, RBOCs eventually will enter the fray. "Think about seven more MCIs out there. AT&T's certainly very well positioned, but it's going to be one hell of a battle between all these players."

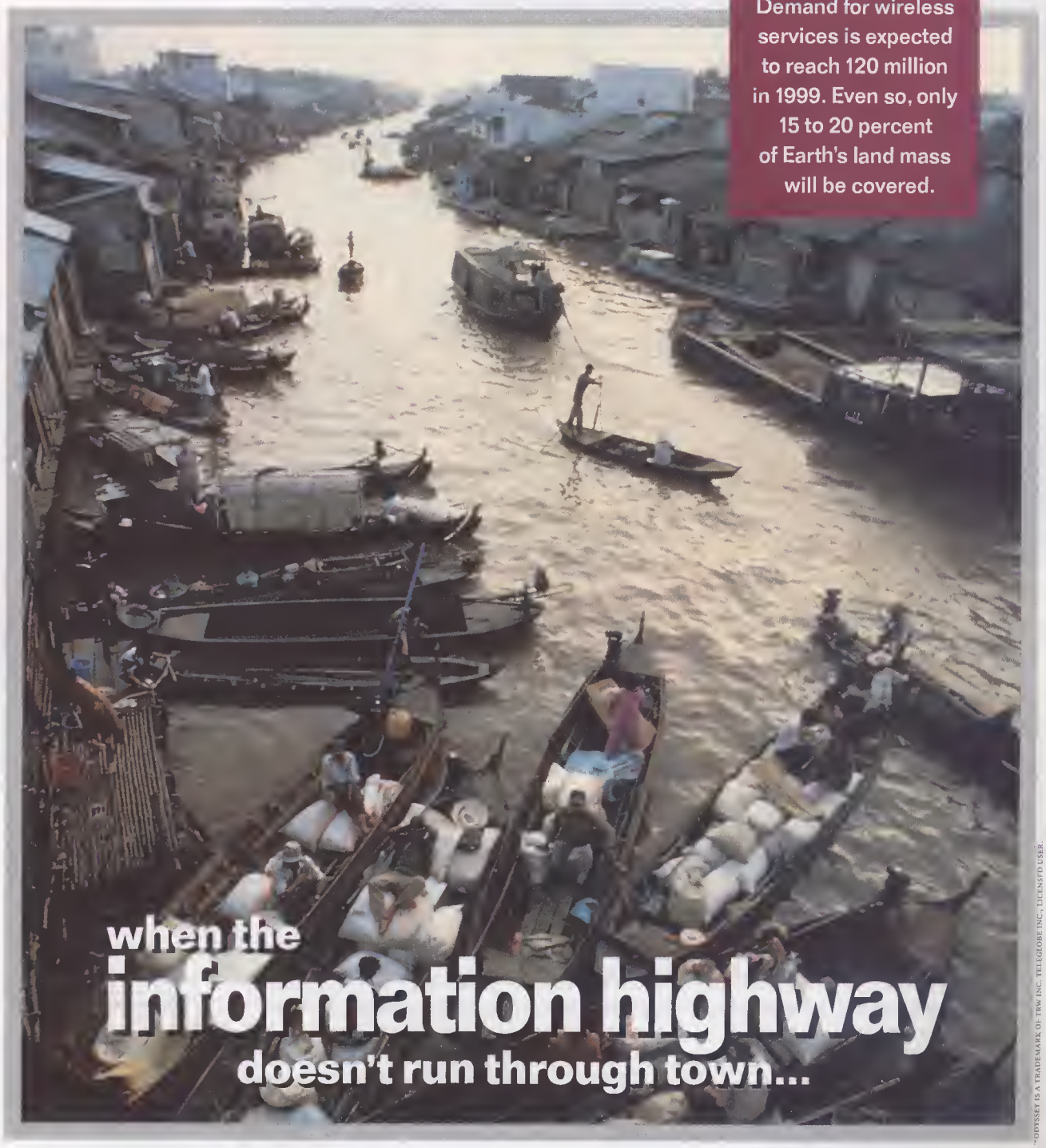
FUTURE LANDSCAPE

The communications landscape of the future will shift carriers' outlook dramatically, continues Adamik. "The aggregation of local and long distance is going to make carriers approach consumers in a different fashion. If AT&T has a less-than-$10-a-month customer, that by today's way of thinking may be considered a low-value customer.

"But tomorrow, when AT&T is in the local market and lots of other areas, that person who was once a low-value long distance customer could become a very high-value communications customer. Maybe he spends $80 a month on local or on-line services or is a cable subscriber.

"Carriers are beginning to look at the full value of the consumer across their entire range of communications service needs," concludes Adamik.

"That's going to be changing things quite substantially." ■



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Circle 132

COMPANY HOPES 'SMART CAR' CAN BE A WIRELESS DATA DRIVER

Vince Vittore
Associate Editor

Analysts expect wireless data—particularly the mobile variety—to take off any day. MTA/EMCI, a Washington, D.C.-based consulting group, estimates revenue from mobile data services will hit $1.5 billion by the year 2000.

However, many of these same analysts were predicting the explosion three years ago, and revenue was supposed to be flowing in by now.

The problem, says Pat Kennedy, is that cellular carriers are aiming at the wrong market. "Their model was yuppies with laptops checking stock quotes in the airport," says the chairman and CEO of CellPort Labs. "It just doesn't work. The market is more than yuppies with laptops. The common, working person needs more than a laptop."

In response, the Boulder, Colo., company is working on a concept that will tie cellular phones together with vehicle engine control systems, GPS transceivers and other data devices. The $2 million "smart car" project also is grabbing the attention of several key wireless players.

Currently, CellPort markets a universal car kit that lets cellular users fit any type of handset into a cradle and run it off their car battery. However, the company has a number of big plans including developing the C/P Connect interface.

Aiming for a debut at March's Wireless '96 show, Kennedy says the interface will showcase six mobile applications:

- automatic placement of a 911 call when an air bag is deployed;
- the ability to unlock a car door from a remote location when drivers lock their keys in the car;
- remote engine performance monitoring;
- interfacing a phone with a GPS receiver, allowing drivers to download street maps and directions to specific locations while driving;
- short messaging service, letting drivers display text messages on the dashboard; and
- interfacing a wireless handset to a laptop for e-mail retrieval and Internet connections.

In some cases, the technologies will be combined to create a marketable application. The automatic 911 call, for example, could be put together with a GPS receiver so that when a call is placed, the 911 operator receives a text message with the location of the vehicle, notification that the air bag was deployed and an indication that voice communication is not possible. In cars without airbags, the handset could be triggered by impact.

A HACKER COULDN'T CALL YOUR VEHICLE AND SHUT IT OFF WHILE YOU'RE ON THE EXPRESSWAY.

In the remote performance monitoring application, Kennedy envisions a day when the local garage calls a customer's car and views engine performance in real time, detecting and diagnosing the cause remotely rather than sending out a tow truck. This application is generating much interest in the automotive industry because it gives car makers another high-end feature, he adds. It also could take the most work to bring to market. "This technology won't be embedded in automobiles before 1998," he admits.

One of the first tasks is figuring out how to integrate the handset with the central processor, which monitors conditions such as oil pressure, air/gas ratio, timing and pollution emission. This creates a local area network within the vehicle, linked to the outside world via the handset. Once that's accomplished, a host of applications opens up, he adds. "We can download or upload that and other information over a wireless link."

Furthermore, any data that can be sent from a car also could be sent into the vehicle, developing the remote unlocking scenario.

One potential conflict in the car-unlocking application: keeping a tight rein on access. If the keys to such a system were to fall into the wrong hands, car thieves could go on a shopping spree. However, because car companies are very sensitive about other vendors accessing the bus that leads to the engine functions, CellPort has built in a gateway through which access will be controlled. "A hacker couldn't call your vehicle and shut it off while you're on the [expressway] or deploy your airbag."

PICKING UP SUPPORT

And while he admits consumers won't see the first installations until at least 1997, many in the wireless industry are expressing their support and opening their wallets. Within the last few months, AirTouch, Ameritech Cellular, Bell Mobility of Canada, Contel Cellular and GTE have pledged partial funding for the project. AT&T Wireless last month also purchased an equity stake in the company.

Additionally, Kennedy has met with car designers and electronics manufacturers, and the company already has received some seed money from Delco Electronics.

Besides helping defray research costs, Kennedy says the addition of such players adds important credibility to the project. "And they thought it was important to jump start the technology." ■

Many of These New Office Buildings Are Demanding More Lines



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DIRECT BROADCAST SATELLITE

CARRIERS LOOK TO DBS FOR QUICK VIDEO FIX

Heavy hitters like MCI plan to bid big in FCC auction of DBS slots.

Deborah Eby
Washington Editor

When you're hot, you're hot. Direct broadcast satellite (DBS) slots are in such demand, MCI declared an opening bid before the FCC even decided to go the auction route. The carrier simply took what the commission considers a fair market price for the slots—$175 million—and declared that's where bidding will start at the Jan. 18, 1996 auction.

Given the costs and complications of fiber/coax, wireless technologies could provide quick entry into the video marketplace. DBS is enticing because "you can serve the whole country with only one headend operation," explains John Aronsohn of the Boston-based Yankee Group consultancy. "The only catch is that you've got to have a satellite, and in order to have a satellite, you've also got to have the rights to the frequencies."

The FCC's January auction winner will gain the rights to 27 channels at 110 degrees west longitude that provide full continental U.S. coverage. Aronsohn says potential bidders read like a who's who of the communications industry.

BLOWN OPPORTUNITY

Advanced Communications Corp. (ACC) originally held the license to those coveted 27 slots. ACC planned to sell the slots to Tempo DBS, a subsidiary of cable giant Tele-Communications Inc. (TCI). Tempo in turn would lease the slots to Primestar, a thriving DBS provider owned by a consortium that includes TCI.

Primestar currently operates in the mid-power sphere, while the 27 new slots would have allowed an upgrade to high-power transmission. While higher power does not improve picture or sound quality, it would increase Primestar's 95-channel capacity to 200, explains spokesperson Caroline Neary. Operating in high-power slots also allows transmission to 18-inch receiver dishes rather than Primestar's 36-inch model. "If you want to really permeate the urban market, where there might be restrictions on dish size or people don't have backyards, you really do need the smaller dish to be effective," she says.



ABCs OF DBS - Message centers transmit digital TV signals to the DBS operator's satellite(s) in stationary orbit around the earth. The satellite then transmits these signals to customers' umbrella-sized receiver dishes, giving subscribers access to a slew of channels like the above sampling from DirecTV.

But the ACC/Tempo/Primestar deal fell through when the FCC recaptured ACC's channels due to failure to build out its DBS system. That move gave the commission the chance to auction the 27 channels, for which Primestar now must bid against its rivals.

EVERYBODY WHO'S ANYBODY

When the gavel sounds, MCI will be a contender, declares spokesperson Michael Lewis. "Basically, our goal right now is to win that auction. We plan on offering video services through satellite by the end of 1996." That goal will be supported by MCI's $2 billion equity stake in Rupert Murdoch's News Corp. empire, which can supply plenty of video/online content through Fox Broadcasting, 20th Century Fox, 130 newspapers and HarperCollins Publishing. News Corp. also operates DBS systems in Asia and Europe.

"Couple that with our existing telephone infrastructure, and we can provide the kind of broadband distribution of entertainment, business and information our customers are increasingly asking us for," says Lewis. "MCI is an international telecommunications company, and our goal is to deliver products and services internationally."

But MCI won't have the field to itself. Plenty of world-class heavyweights will vie for DBS slots, assures Aronsohn. "I know for a fact that the long distance carriers are all considering this, as well as the RBOCs. Everybody thinks there's enormous potential in DBS and so no one has totally dismissed it yet."

The Yankee Group has projected today's 1.2 million DBS subscribers will balloon to 7 million by 1999. If a heavy hitter like MCI wins the auction, that num-

ber could go even higher "because of marketing muscle. They would definitely market DBS to all their existing customers and offer special discounts. If they could also finance the customer's purchase of the dish, that would help the market enormously."

Although video entertainment may be the biggest money-making DBS service, bidders plan to exploit other potentials as well. Aronsohn says the medium is well-suited to on-line services "where there's a lot of data coming in and very little going out."

He adds, however, that a bigger back channel could be created with a modem using the telephone network.

Lewis expects some surprise bidders—maybe software companies. "The day that Windows 95 was introduced, Microsoft could've delivered that software to all the consumers and businesses who had signed up and it could've been on their computer that morning."

He concedes that with all the competition, someone could outbid MCI. "We haven't won this spectrum yet, and so we're definitely keeping our options open in case we don't win. That could mean alliances with others."

Aronsohn predicts that "in the long term, the DBS market will become a market for large players. Large communications companies will eventually absorb most of the current DBS operations and take them as their own."

The technology offers an efficient way to get video products to a broad market, he adds. "The large companies are looking to package their existing services with video services like those delivered by DBS, and so DBS looks very attractive to them." ■

ATM APPLICATIONS

'GEE WHIZ' ATM GETS SERIOUS

AT&T and GTE announce real-world applications for ATM technology.

Patty Wetli
Associate Editor

ATM. "It's a neat technology. Now what can I do with this?" Pat Russo, president of AT&T Global Business Communications Systems (GBCS) asked and then answered.

The company recently announced its MultiMedia Communications eXchange Server (MMCX), which extends call features to local and wide area networks. "It's really an invention," says Russo, claiming the MMCX creates a new class of products that allows customers to use office telephone features—such as conferencing or transferring—on multimedia calls involving voice, data, image and video.

In other words, it takes the best of the voice network and brings it to the data world.

Developed by Bell Labs and GBCS, the product supports multimedia calling on switched Ethernet LANs and on ATM networks. "We're extending our business beyond voice," Russo explains. "It's a new and distinctly different kind of premises networking capability."

GBCS is convinced the "enterprise information network will be multimedia" capable, and "ATM will surely smooth the way" toward the company purchasing, installing and managing these networks for customers.

"Our focus is on a totally comprehensive approach," she adds. "Our emphasis is on network management and support."

Russo notes that the MMCX is but one component of an entire concept, which the company has dubbed BusinessWorks Solutions. Importantly, however, in these times of uncertainty, the product enables new applications without tearing out existing technology. It's about features that sit on top of networks—it's a transport phenomenon, the company says.

If the MMCX is the "gee whiz" (a Unix version will be available at the end of first quarter 1996, a Windows version by yearend 1996), BusinessWorks is the nitty-gritty. According to the company, customers have identified three areas needing multimedia capability: customer sales and service, support for mobile employees and conferencing and shared applications; BusinessWorks attempts to address those needs.



BODY OF EVIDENCE - Joe Fridoy never hod it so good. A close-up screen shot disploys o mug shot ond on evidence photo. The evidence photo, shot under speciol lighting, shows o cleorly-visible fingerprint on o gun. When the computer's mognifying tool is used, the ridges of the fingerprint con be seen. Such evidence now con be viewed simultaneously by low enforcement professionols in vorious locotions.

Since July 1994, McDonald's has been trialing the MMCX to see how it holds up in the real world. The company used the product to aid its engineers and designers

continued on page **18**

ATM APPLICATIONS

continued from page **17**

in planning restaurant and kitchen layouts. Before the MMCX, teams created the design and overnighted a disk to the regional office, which would make modifications and return the disk to headquarters. Now the two offices can make changes in real time, according to McDonald's representatives. "We can get closure on issues immediately" by conferencing in appropriate participants and sharing documents and designs on screen.

GTE GOES REAL WORLD, TOO

While Ronald and the Hamburglar trial the MMCX, GTE is using ATM to help Florida law enforcement agencies take a bite out of crime in a scenario that goes way beyond "Miami Vice."

Under a program funded by the Office of National Drug Control Policy in Washington, D.C., GTE will establish a seven-node ATM network to link the Pinellas County Sheriff's Office with the St. Petersburg Police Department and other law enforcement agencies in Hillsborough, Manatee and Pasco counties. "It's a new model for law enforcement," says GTE spokesperson Cris Coffin.

"What we're looking for are real applications" for ATM, she continues. The company certainly seems to have found some. When linked, the various law enforcement agencies will be able to call up digitized rap sheets, mug shots and fingerprints simultaneously.

Previously, an officer traveling out of jurisdiction might have forgotten crucial paperwork or evidence when discussing a case with colleagues at a distant location. But with the new ATM network, that information always will be within reach—of a workstation.

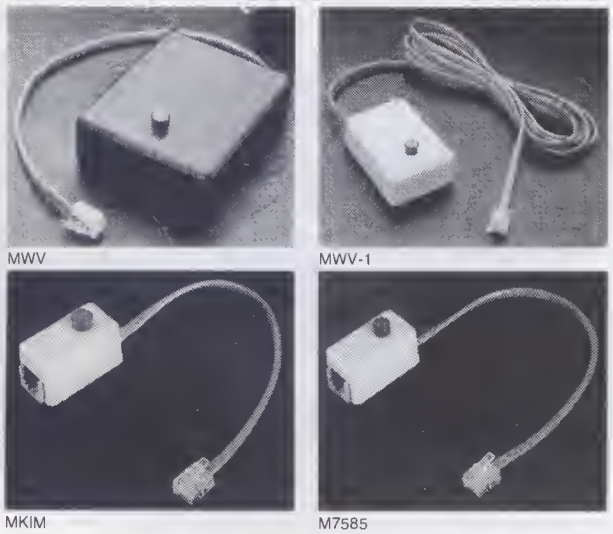
Video sources also will be available to the officers. Coffin explains that a drug bust could be filmed and shared in real time, helping the officers identify individuals crossing jurisdictional boundaries. Or they could conduct a video lineup, beaming in a suspect being held at a another location.

All these applications will be enabled by the "incredible bandwidth" of ATM, says Coffin. She notes that two of the planned seven nodes already are up and running: one in St. Pete and another being used by the Narcotics Division at a "secret location." The next phase is to link to other counties as part of the ongoing $2.5 million project.

And then—who knows? Police forces in cities as far flung as New York, Chicago and San Diego already have expressed interest in setting up similar networks.

Sounds like we've got a customer-driven technology on our hands. ■

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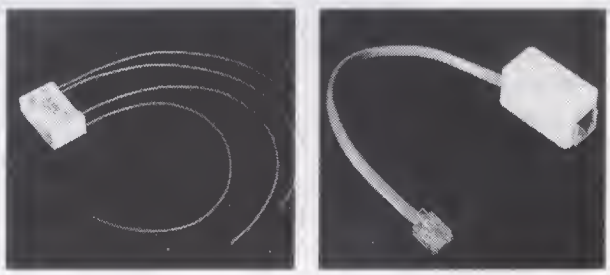
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6 ☐ BellSouth
7 ☐ Pacific Telesis
12 ☐ Bell Communications Research
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OTHER SERVICE PROVIDERS
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50 ☐ MSO (Two or more Cable TV Systems)
55 ☐ Independent Cable TV System
60 ☐ Cable TV Contractor/Engineering Firm
65 ☐ Other Cable
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190 ☐ Cellular Operator
195 ☐ PCS/PCN Operator
205 ☐ Other Wireless
180 ☐ Long-distance/Interchange Carrier
185 ☐ Competitive Access Provider (CAP)
220 ☐ Telecommunications Reseller
170 ☐ Other Carrier
120 ☐ TELECOMMUNICATIONS CONSULTANT
135 ☐ CONSTRUCTION CONTRACTOR
140 ☐ CONSULTING ENGINEERING FIRM
150 ☐ MANUFACTURER OR DISTRIBUTOR OF TELECOMMUNICATIONS EQUIPMENT
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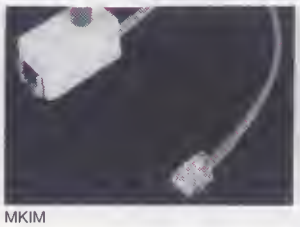
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BELL ATLANTIC:
A LOOK UNDER THE HOOD

Today's newspaper headlines, major magazine coverage and, increasingly, television network news pay almost daily attention to the changes occurring in the telecommunications industry. Regulatory changes, congressional action, mergers and acquisitions, new arenas of competition, new products and new technologies are in from of us every day.

The companies that manufacture and sell to the major players in this industry need to stay abreast of these events, but they also need to understand and keep up with each of their target customers. While similarities exist, differences abound. *The Friduss Report: An Insider's Guide for Selling to Carriers* navigates these large service provider organizations by bringing a sense of clarity to the procurement landscape; individual carrier vendor/supplier strategies; a layout of involved organizations; how buying processes work (including key stakeholders); how decisions are made; and how vendors and suppliers need to interface with these processes.

Knowledge is power. Understanding your customer's procurement landscape will help get you to the front door, but the right products, services and innovation that make a difference in your customers will always be the key to success.

This issue of *The Friduss Report* takes a look at Bell Atlantic's specific needs and policies. We'll appraise you of the corporate credo: The Bell Atlantic Way. The company's structure and buying processes also are detailed for suppliers looking to weave their way through the procurement maze. Getting the right product in front of the right buyer at the right time will be key to success. And management's biggest word of advice: persistence.

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LOCAL RESALE

PAC BELL UNDER FIRE FROM RESELLERS

Eric Krapf
Managing Editor

A decade ago, resale played a key role in prying open the long distance market, and now the struggle to repeat that process on the local level is proving no less contentious.

Heavyweight interexchange carriers are duking it out with incumbent local exchange carriers over rates, charges and terms for local resale, while some resale proponents are deciding their best bet may be to avoid incumbent LECs wherever possible and promote relationships with fiber-based competitive access providers.

In the most recent state regulatory battle, would-be resellers in California complain Pacific Bell's proposed resale rules unfairly burden newcomers with unprecedented charges and fix wholesale rates too high for resellers to turn a profit. The RBOC, of course, denies it's trying to stack the deck and says resellers face a dilemma shared by countless other businesses: whether to build facilities or lease them.

DO UNTO OTHERS

Pac Bell's position on reseller relationships goes against decades of telecom practice, argues Bill Harrelson, senior counsel-western region and governmental affairs for MCI. The RBOC wants to charge to reprogram switches to recognize competitors' NXX prefixes, even though "other carriers do that for Pac Bell all the time" without charging—carriers such as MCI.

If Pac Bell has a particular NXX prefix, "we have to make sure our switch in St. Louis recognizes that NXX code," Harrelson says.

"It's something carriers do for one another because they're in business and they have to interconnect," he concludes. "Competitors need to be treated as co-carriers."

MCI also objects to Pac Bell's proposal to sell its measured business service for resale. Charged a monthly $10.32 rate not counting usage, resellers can't possibly compete for residential customers paying Pac Bell's $11.25 rate, says Harrelson—especially since Pac Bell would tack on a monthly $3.50 per-line charge plus a one-time $32 charge for interim number portability.

THEY MAKE MONEY ON LOCAL SERVICE. NONE OF THOSE RBOCs IS HURTING. THEY'RE AMONG THE LARGEST COMPANIES IN AMERICA.

Pac Bell responds that it's perfectly appropriate to charge competitors for procedures that otherwise wouldn't be undertaken. "The fact is that these prefixes are needed because the new entrants are coming in and they need prefixes," says Lee Bauman, Pacific Bell vice president-local competition. He maintains the RBOC is being reasonable in proposing to share these costs, instead of demanding competitors foot the entire bill.

And while insisting Pac Bell is "eager" to implement interim number portability, Bauman claims this feature is "not quite as important [to customers] as the others were saying." MCI claims 80% of customers want to keep their phone numbers when switching carriers.

Aside from number portability, MCI wants the state Public Utilities Commission to determine what costs Pac Bell avoids by selling in bulk, and then subtract the saved costs to arrive at wholesale rates. According to Harrelson, MCI figures the RBOC's savings at 28%, which would yield a wholesale rate of $8.10 on the monthly $11.25 retail rate.

Pac Bell, naturally, isn't buying the 28% figure, "but we are very supportive of taking out whatever cost can be shown," adds Bauman. "We're not saying there's not a difference." However, he points out that in the Rochester experiment in local competition, this difference was 5%.

Resellers are disappointed in Rochester's experiment. Ernie Kelly, executive director of the Telecommunications Resellers Association, readily concedes the lack of an adequate margin means the program "has not proven to be successful" from a reseller's viewpoint. Such an experiment likely won't succeed unless multiple wireline carriers are forced to battle each other for the reseller business, he adds. "The reason that resale works in long distance is that the industry is competitive."

CAPS TO THE RESCUE

That's where CAPs come in. TRA is pushing to bring its members together with CAPs, where Kelly sees "synergies," since most of his members are geared toward small business and commercial accounts. The group also is wooing big interexchange carriers to broaden its base.

Kelly rejects claims by Pac Bell and other RBOCs that resellers want incumbent local carriers to sell service below cost. "That is such a self-serving, ridiculous argument," he says. "They make money on local service. None of those RBOCs is hurting. They're among the largest companies in America."

But Pac Bell's Bauman insists it's not any LEC's job to subsidize potential competitors, who he says must examine their business cases and decide whether to build or lease. He calls it "wasteful and ultimately unfair to base these decisions on anything but cost." ■

WHICH IS BETTER?

HFC OR SDV?



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NEW PIPE - SNET's Hoshang Mulla with the new cable the LEC developed for its HFC network.

HFC NETWORKS

VOICES CARRIED

SNET shows HFC supports telephony.

Gary Kim
Contributing Editor

"Watson, come here. I need you." With that playful nod to telephony's past, a Southern New England Telephone technician turned up the first commercial access line running on SNET's new hybrid fiber/coax (HFC) network in Stamford, Conn.

As of late October, SNET had begun moving about 50 Stamford-area customers from the older twisted-pair network to the new HFC access network. By yearend 1996, SNET anticipates switching some 80,000 customers to the new network. Company executives say "firm targets" have been set for converting additional customers over the next three years.

Some local exchange carriers—those whose residential broadband plans are predicated on new revenues—may be in a position to postpone upgrades. But SNET has allocated the lion's share of the cost of its new network to support existing services. So the company must proceed expeditiously in moving POTS customers over to the HFC network.

Among the key lessons SNET already has learned: It works. Telephony can be carried over an HFC network, using commercially-available equipment from multiple suppliers. For the first time, a major U.S. public network successfully has moved residential customers over to the new platform.

The second lesson: Mastery of the coax medium will be essential for telephone and cable TV companies alike. "We've gained an appreciation that mechanical handling is important," says Hoshang Mulla, SNET director-network planning. For example, carriers must understand the impact of construction and maintenance practices that lead to dented cable, improper cable bending radius and expansion loops, says Mulla. Mechanical issues entirely at the physical network layer can cause frequency-dependent loss of the signal path, as experienced technologists might have predicted, and as SNET appears to have discovered.

Mechanical issues also were important on the network's optical side. As the network was certified, technicians had to clean connectors and remove oil that added an unexpected 10dB attenuation, for example. At least one patch cord was connectorized improperly, again leading to excessive signal attenuation at a transmitter.

Turning up the network also required a firm grasp of radio transmission techniques. "Clearly, a lot can be learned from other radio frequency networks," says Mulla. "This is analogous to a cellular RF network. It's just a much more controlled cellular network, in a sense." As in a radio network, technicians had to tweak transmission equipment to ensure proper response at all in-use frequencies, correct signal launch and receive levels. Maintenance of distortion parameters also proved important.

After more than a year and a half, during which time most of SNET's telephone brethren vacillated wildly on residential broadband infrastructure choices, SNET technologists diligently plowed ahead with a network upgrade whose objectives remained crystal clear: eliminate all twisted-pair wiring from all parts of the network except the drop. Even without taking future needs into account, SNET technologists insisted the new network be deployed as a key weapon to drive down maintenance costs dramatically.

"The fact is, SNET came up with the best balance of getting rid of twisted pair, getting broadband to the curb and doing it all cost effectively," says John Frederick, ADC Telecommunications program manager-access platforms. ADC and AT&T Network Systems have contracts to supply transmis-

continued on page **30**

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SNET VOICE

continued from page **26**

sion electronics for the network's voice and data subsystems.

Typically, at least six optical fibers extend from the central office to neighborhood optical network units. From there, four coaxial cables stretch past about 50 residences each. Depending on housing density, each cable can stretch several kilofeet. In the base case, five fibers are active (four for telephony, one for video) while one is a spare.

Based on neighborhood demographics and business customer locations, additional fibers may be deployed. Redundant optoelectronics and automated switching allow reconfiguration of the active fibers. Where density is high or larger businesses served, next generation digital loop carrier (NGDLC) might be used. Single-line or two-line units might be deployed where housing density is low.

In essence, the voice-over-HFC technology matches a CO host digital terminal with a customer terminal that essentially moves line cards from a remote terminal to the pedestal or traditional aerial drop wire location. The design also supports higher-bandwidth connections. All SNET NIUs are designed for upgrade to high-speed data service. SNET's NIUs can add a line card providing a DS1 [1.544 Mbps], according to Mulla.

SNET also is deploying its subscriber terminal equipment to reduce sources of ingress noise and distortion that can bedevil an HFC network. The company is using four-home NIUs in its residential areas. These pedestal or aerial units, each supporting 12 access lines, have advantages over side-of-home units, SNET believes. For one, "four-fifths of the coax in a typical HFC network is flexible cable," says Mulla. That's a problem because drop cable doesn't have the shielding integrity of hardline coaxial cable, increasing the amount of noise that can interfere with network transmissions, Mulla notes.

If telephony traffic is carried through drop cable to the side of the home, the potential sources of ingress (unwanted energy leaking into the network) are multiplied vastly. The SNET NIU plan eliminates the possibility that upstream noise can come up the drop, says Mulla. "It's a star network for telephony purposes, from the NIU to the home," he notes. Though it's early to draw firm conclusions, this type of deployment "must work better" than any network using coax for telephony traffic between curb and home, SNET believes.

Technicians in the field say they're impressed with the NIU design. That's probably no coincidence, since AT&T Network Systems didn't handle the product development process in the classic way, says Scott Grout, AT&T program management director for SNET.

"Installability and serviceability" were built into the NIUs by an ongoing series of craft design reviews, where SNET technicians were able to help shape the devices, he says.

SNET HAS A POWERING DESIGN THAT IS "SIMPLE, ELEGANT AND FAMILIAR."

Eliminating twisted-pair wiring in the outside plant, along with placement of customer terminals, allow automated diagnostic testing all the way to the customer, officials say. In the past, that capability would have been available only between the CO and a remote terminal location. In practice, the presence of loading coils, for example, required "lots of interpretation" when troubleshooting, says Mulla. But the extremely short lengths of drop wire that remain in the network remove that uncertainty. Also, as a byproduct of its NIU placement strategy, SNET can "use the same control electronics to shut video off and on," says Frederick.

SNET also wasn't comfortable with the distributed powering schemes typically used in HFC networks. So the company invented a new type of cable that allows centralized powering of the entire network from the central office. Using the new cable, SNET has a powering design that is "simple, elegant and familiar," Mulla says.

The new cable features a central conduit for the optical fiber and an array of aluminum power conductors packed on the outside of the conduit, encased in steel armor and then covered by a polyethylene sheath. Unlike traditional telephony practice, current is 480vac.

The new design addresses several fundamental goals:

- Consume as little power as possible.
- Minimize the physical size of powering facilities.
- Reduce maintenance chores.
- Avoid rights of way and site approval issues.
- Improve network reliability.

Technologists at Littleton, Colo.-based National Cable Television Institute say SNET is correct to identify craft practices as crucial. Construction and maintenance procedures are important, but performance of active network elements, including optical transmitters and radio frequency amplifiers, for example, is even more important.

"Flatness," the attribute of an HFC network where no radio carrier is more than 13dB above or below any other carrier on the network, probably will prove an issue for most HFC networks, NCTI officials say. And all distortions should be at the -53dB level or better, despite the fact that the FCC only requires -51dB performance for second- and third-order distortions.

Of all the problems telcos likely will encounter when turning up a "green field build" network, flatness probably will be the most common operating parameter out of tolerance. Flatness can be affected by several factors including optical transmitters and amplifiers operating in an out-of-alignment mode, for example.

Improper connectorization or mishandled cable, however, will tend to cause problems, such as abnormally low signal levels, at only certain points in the network passband. Typical culprits include:

- loose connectors;
- kinked cable; and
- moisture in cable.

SNET's new cable, supporting centralized powering, and its curbside NIU, which reduces signal ingress, may be the most important new developments in HFC technology to come out of the Connecticut-based telco's experience. But the practical lessons its technicians have learned about coax cable handling and radio frequency electronics may have the widest applicability for mass deployment of voice-over-HFC networks, there and elsewhere. ■

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MARKET ANALYSIS

NO MORE FALSE STARTS FOR ISDN

Web access has given the technology a jump start, but will it have market staying power?



Mark Dziatkiewicz
Contributing Editor

Credit the World Wide Web, RBOCs or looming competition, but 1995 has been a good year for ISDN. It's readily available across the nation, deployment numbers met expectations and—surprising to some—there are growing signs that market pull really exists.

ISDN's value links directly to its switched roots, and with RBOCs reaching near-universal availability, it's an island no longer. "Bell Atlantic is the number one RBOC in ISDN service," says Tony Price, Bell Atlantic director-information services for ISDN mass market strategy. "Ninety-three percent of the homes can get it at the same rate. And we have more digital switches—96%-97%—than any other RBOC."

AVAILABILITY/DEPLOYMENT

Availability numbers show an upward trend at all RBOCs *(see figure, page 38)*. Ameritech boasts 85% regionwide and as high as 95% in its larger metro areas. Pacific Bell has 93% access line availability. Nynex sees near-universal New York deployment. "I'm 100% deployed from Westchester on

continued on page **38**

ISDN GETS CHEAP

ISDN may be available widely, but affordability's still a primary driver for residential markets—and for a long time ISDN wasn't affordable. That's not the case any longer.

Aggressive pricing by major manufacturers has moved ISDN into more affordable ranges for price-conscious consumers. "We're selling ISDN terminal adapters for anywhere from $275-$399," says Tony Price, Bell Atlantic director-information services/ISDN mass market strategy. "That's what will drive ISDN service, being able to buy ISDN terminal adapters for the cost of a 28.8 modem."

And it drives application opportunities as well. "As ISDN becomes more aggressive in price, the advantage of an extra phone line plus more and more use of the Web makes it attractive," says Rich Redelfs, director-marketing for mobile and access products at 3Com. "Categories such as telecommuting or someone who doesn't feel like driving into the office after hours or on weekends will expand. The time savings is well worth the extra cost of the equipment."

Despite simplification processes, ISDN equipment can be complicated. "There's still issues on configuration," says Lisa Volmar, director-product marketing and management/digital products for Motorola ISG. "As long as there continues to be switches that customers have to specify, we're always going to have a configuration utility."

One of the newest terminal adapter features is multipoint PPP (point-to-point protocol), supported by products from 3Com, Motorola and others. "It allows you to have two separate connections on your B channels and link them together for a single data stream, getting a 128 kbps connection," explains Redelfs.

And with prices dropping, features remain an ISDN differentiator. "Compression is going to be the next up-and-coming feature," adds Volmar. ■

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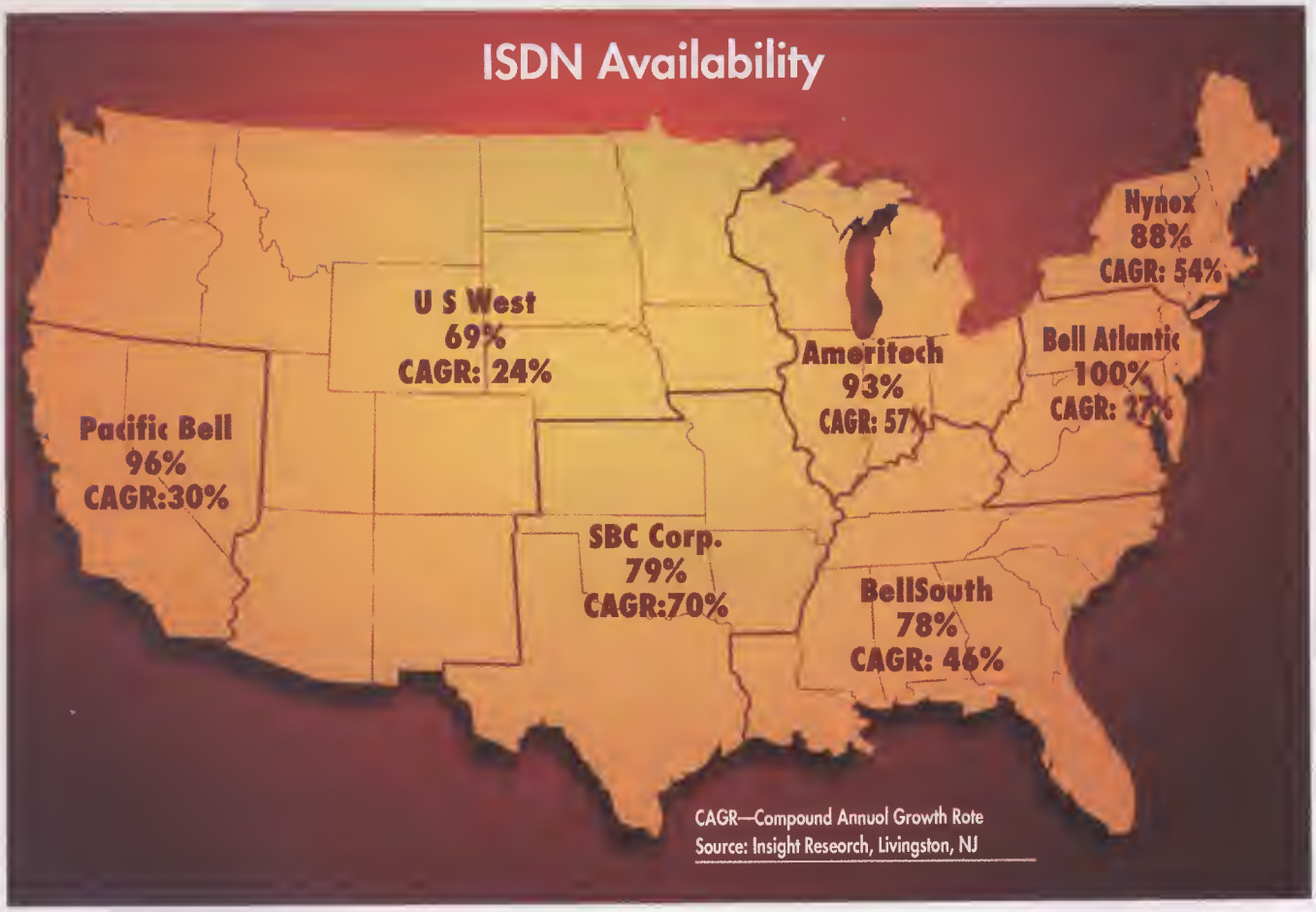
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Circle 115





ISDN

continued from page **34**

down," says Michael Vallone, product manager-ISDN basic service. "Upstate will be completed by the end of the year for 100% virtual."

Even U S West—an early ISDN critic—is coming around. Though it trails all RBOCs with 63% overall availability, metropolitan areas are making significant strides with 90% access line capability in its top 12 markets. Credit high-speed, access-hungry customers for the about-face. "There were several false starts in providing ISDN, but it was lack of a real need that kept us from provisioning many switches," explains Mitch Glasser, marketing manager-ISDN. "There were a lot of people in the company who said ISDN is important, but they were like the boy calling wolf. The good news is people want it; the bad news is they really want it and want it quickly."

Virtual ISDN connections—remoting off ISDN-capable central offices instead of home COs—offer one option for providing ubiquitous service. It's a necessary option considering deployment costs. "In a ballpark scenario it can be $350,000 to $500,000 to equip an office for ISDN," says Phillip Cook, Bell South product manager-narrowband switched data services. "But even in remoting, you have certain limitations."

While it doesn't justify ISDN's past attention deficit, U S West understands the implications. "We do have a good portion of our local loops beyond 18,000 feet and in some areas beyond 30,000 feet," explains Glasser. "But the market has our attention now and we're looking to put things in place to meet the need."

Despite its slow start, U S West has 30,000 ISDN basic rate lines deployed. It's not significantly different from Pacific Bell's 47,000 total lines. And while some RBOCs don't quote line counts for competitive reasons, total ISDN line deployment meets expectations, according to Bellcore's Karen Fitzgerald, director-business development for its core networks business unit. "The estimate for yearend is 650,000 lines, which pretty much tracks what we thought it would be."

SIMPLIFICATION

Fitzgerald credits ISDN ordering simplification for some gains. "We're working with the industry to boil down ordering codes to just a few," she says. "Ordering codes allow for a lot of automation. When regions are looking at millions of lines of ISDN they realize they need to pump through 2000 orders a day for the next year."

Ordering codes improve ISDN's complex implementation process but don't solve it. "Bellcore did instigate the ISDN ordering codes and simplification process, but like everything, it's been adopted at different levels," says Cook. "All the regional operating companies believe we need to make it simple, especially to the consumer market. We have specific goals before the first of the year to crack the nut and make it easy to order in the consumer side of the house."

continued on page **44**

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ISDN FINDS NICHE WORTH BANKING ON

Vince Vittore
Associate Editor

Forget Internet and remote LAN access. ISDN is receiving one of its biggest boosts from the banking industry. In a field whose requirements generally call for round-the-clock, failure-proof connections and massive data transfers, ISDN is providing a vital last link by extending advanced services to customers in non-central locations. At the same time, banks and other financial institutions are saving costs by replacing underused leased lines with ISDN.



Switzerland offers one of the best examples of ISDN extending the reach of financial institutions; a new electronic trading system is being set up by Lotus and Unicibel, a Swiss consulting firm owned by four large banks. Using Lotus Notes, the Swiss stock exchange will convert to an all-electronic trading system, replacing present trades done by phone or fax.

In the new system, the biggest banks will connect to a central exchange by dedicated pipes. However, banks that can't justify leased lines will use ISDN.

"They [the smaller banks] can't do it on line because it's too expensive. So we included them by using lower-cost technology [ISDN]," says Michael Bloc, project manager for Lotus. The system, he adds, will be up and running in early December.

Under a scheme devised by the two companies, the trading process will begin when a clerk at the bank fills in a form created by Power Builder and puts it into a Notes database. At 10-minute intervals, the information is transferred via ISDN to one of the big banks, where it then is translated into an SQL request. "It's under a 10-second transaction," says Bloc of the first link.

After the big bank transfers the request, it is dumped into a Sybase database where it's matched with a corresponding order; the trade is completed and a confirmation is sent the reverse route. "There are lots of different options. You can set up a trigger to buy so much at a price and sell at another price. It depends on what you want to do."

Key in the system is the ability of banks to handle a much higher trade volume. Smaller banks, which typically place 50-100 orders per day under the old system, now can put in as many as 200 orders per day. At the same time, ISDN is saving the banks money—they pay as they go. The decision to use the technology also will let the system bring on others since 90% of all businesses in Switzerland have access to ISDN.

0B+1D

Stateside, carriers generally don't have quite that coverage, except in many major metro areas where some companies are upgrading service to ISDN.

The MAC network, which consists of more than 2000 automatic teller machines, now operates several ATMs using only the D channel of ISDN.

As Don Murtagh, director-telecommunications for Electronic Payment Services (EPS), explains, the company now has almost 700 ATMs running on ISDN, with the remaining to be converted by next year. "We're ordering 0 B+ D. So we're not even paying for any B channels."

The actual cost savings won't be known for some time, but Murtagh says the company is looking beyond simple numbers. Because ISDN also can carry video, it's feasible that someday customers could contact customer service reps directly and speak with them via video conference. It also is possible for them to purchase tickets. "We're looking at it. It's the same principle you would have with desktop video where you have a camera on a PC. Inside the ATM, it's basically a PC processor."

That, of course, assumes carriers can provide ISDN service everywhere it's needed. Murtagh adds, the company will not use remote ISDN service because of the cost. "In those cases, we stick with the analog line." ■



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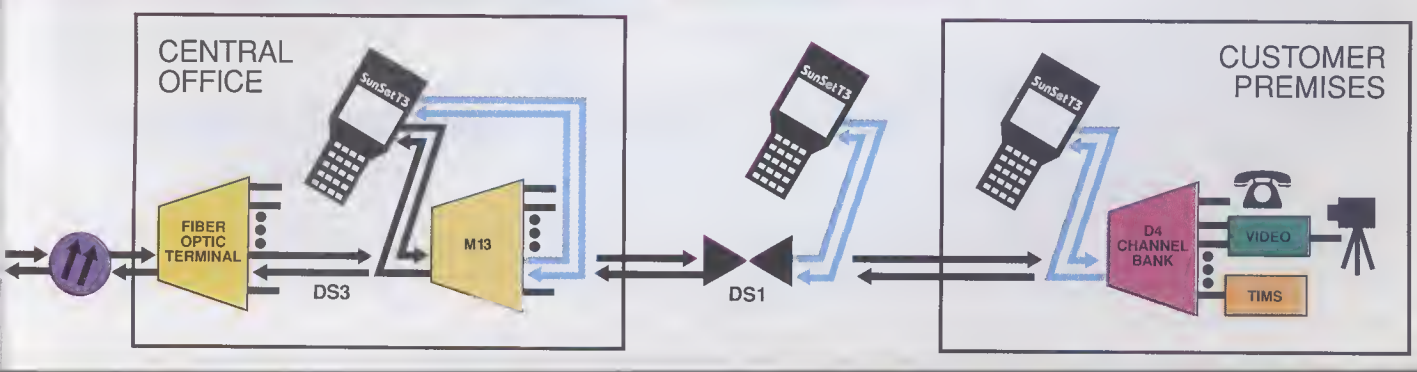
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... A step ahead



ISDN

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Recent alternatives include establishing service packages targeted to common applications, containing all implementation necessities. "Our newest project is ISDN order simplification," says Nynex's Vallone. "We come up with a superset [of services] encompassing several packages of ISDN ordering codes."

Ameritech goes a step further by offering terminal adapters and call management software in its Home Professional Package, a mass-market offering. "ISDN is too complex, too costly and there aren't enough market channels to bring it to a mass market," explains Bob Sharkey, manager-new products, Ameritech Consumer Services. "There are over a thousand combinations as to how you can configure ISDN. We took one combination and established a package of features we thought appropriate for the mass market."

The offering combines high-speed data access with professional telephone capability, such as three-way calling and caller ID. "We wanted to get as much value as possible out of an ISDN line. People are not on their computers all day, so we wanted to give them additional telephone capabilities." And with apparent consumer focus, ISDN is never mentioned. "We're selling a service package of high-speed data and professional telephone services, supported by ISDN," he adds. "When you order a regular POTS line, we don't ask you if you want it on a SLC-96—it's the same with ISDN."

POSITIONING/PRICE

Though market approaches differ, RBOCs see similar ISDN opportunities, with Internet access, remote LAN access and telecommuting topping the lists. Most concentrate on business applications but see increased residential opportunities, especially with reduced equipment prices (*see sidebar, page 34*).

"We are marketing it primarily as a business service, but there's a large latent need for residential. We have a separate marketing group for home office, and that tends to be one of our most active channels," says U S West's Glasser. "We've been mostly in the business market because they've been able to afford it," adds Bell Atlantic's Price.

Pacific Bell also has seen success with point-of-sale ISDN applications, using X.25 on the D channel for credit card verification. "There were a lot of businesses that weren't able to accept credit cards," explains Don Roe, product manger-ISDN. "ISDN, with its quick call set-up, makes it a reality. When you get into a fast food restaurant and it takes 15-20 seconds to get approval, it doesn't work. But if you can get approval in two to three seconds, that's another story." Residential deployment's been minimal so far and since none of the RBOCs position ISDN as a POTS replacement, second-line opportunities prevail. "We don't advocate

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ISDN

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ISDN to be a replacement for the primary service because of the powering issue," continues Roe. "We suggest this as a high-speed second line, giving you the benefits of a second and third line," adds Ameritech's Sharkey. With confidence in the residential and home office markets, RBOCs are adding retail sales channels. "Traditionally it's been more of a direct-channel sale, but we're transitioning to indirect channels including retail outlets, sales agents, equipment providers and VARs." says Roe.

Other sales support initiatives include 1-800-GET ISDN at Nynex for automatic availability information: "You punch in a number and get an answer, yea or nay," says Vallone.

Service pricing is attractive, ranging between $24 and $32 a month. But flat-rate and measured service differences make it buyer beware. "It's not market-based pricing," adds Bellcore's Fitzgerald. "It's kind of deeply rooted in cost recovery rules that have gone on for quite some time."

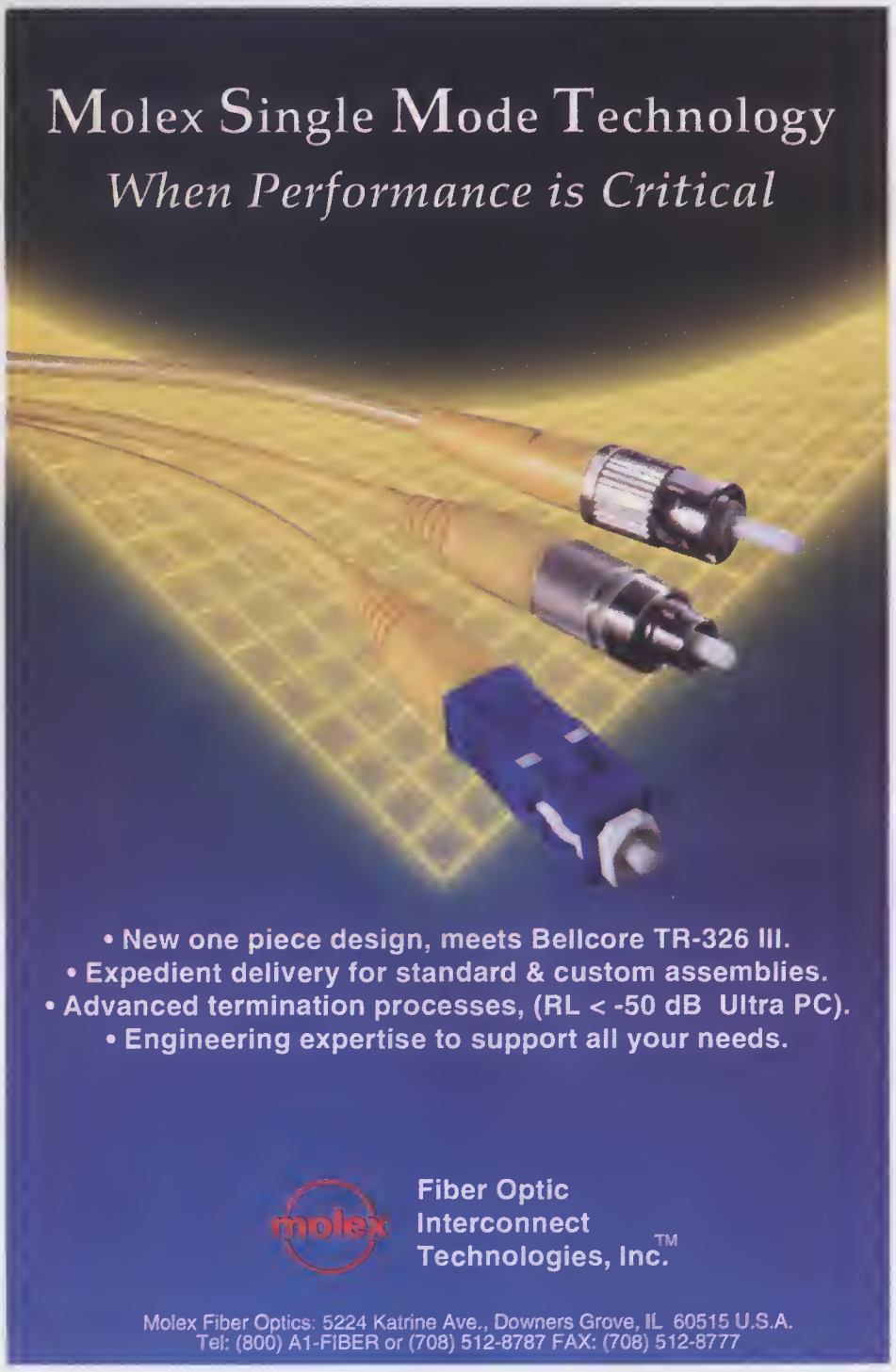
Those rules—and PUC policies—often dictate flat-rate or measured service mind sets. "Our pricing is flat rate," explains Cook. "When we did our cost studies, we took it all into consideration. On the data side, we make sure we recover our cost." Pacific Bell combines both service plans in its residential offerings with after hours, weekends and holidays flat rated. Bell Atlantic believes customers should pay for what they use.

REASONABLE DOUBT?

There's no question RBOCs are upbeat on ISDN's opportunities and prospects. Not everyone sees the world through RBOC-colored glasses, though. Cable company competition and high-speed modem offerings loom, but a lot depends on maturing technology and service packaging.

Robert Rosenberg, president of Insight Research, acknowledges ISDN's upswing but doesn't see long-term staying power. "The numbers have improved, but there's still the cumbersomeness of the whole process," he contends. "If you simplify it from 11 to four steps, is that simplification? Everyone tells me the numbers have substantially changed and certain industries are moving along, but this is still a relatively small market. If you were a network provider and had a choice between doing a wireless service and doing ISDN, I'll tell you which one you'd grab faster."

Disbelievers aside, RBOCs only can gain by experimenting with in-place ISDN investment. "We can't build fast enough. Customers are demanding it and it's no longer a luxury. POTS is dead," concludes Nynex's Vallone. When you look at it that way, ISDN's decade-plus saga seems almost justified. ■



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SWITCHING

WILL SERVERS KILL SWITCHES?

Or can local loop switches adapt to the predicted client/server future?



VOICE SERVER? - AT&T Network Systems sees a future for its 5ESS switches, even in a distributed-switching future.

Eric Krapf
Managing Editor

Even the big vendors agree: within a few years, local loop switches will be replaced by "voice servers." The debate between doomsayers and defenders centers on whether this change is more seismic or semantic.

Open systems, distributed switching, client/server technology: these trends could doom the big Class 5 switch business, argues a new report from Cedar Knolls, N.J.-based Probe Research. Authors Fred Seigneur and Allan Tumolillo write darkly of "the seeds of disaster for the switch vendors," asserting telecommunications networks will follow the computer model, with big central office switches equivalent to dinosaur mainframes. The authors see an opportunity for computer companies to end-run unwieldy, outdated networks, with more cost-effective networks running off cheaper servers.

Switch makers also see a migration to a new network model, but, unsurprisingly, believe they'll weather the transition with their big switches mostly intact, if different. Besides, mainframes aren't exactly extinct, argue several manufacturers, and a telecom network with increasing traffic loads may need a super-server—a role some mainframes have adopted.

The report proposes a new network model its authors call ROADS (Robust Open Architecture Distributed Switching). In this model, "switching functions are distributed to open architecture subsystems.

"Virtually all the hardware required to build ROADS is available in the industry today from multiple vendors," the report asserts. "With minimal enhancements to these hardware platforms and server-based software providing call processing and network management functions, the traditional 'switch' becomes a superfluous appendage."

Seigneur, the chief author, and Tumolillo, who wrote the chapter on ROADS's effect on big switch makers, claim new competitors building networks on the ROADS model "will have an absolute competitive edge over incumbent carriers." That's because incumbent carriers are yoked to a costly network architecture inherited from a time when the goal was to minimize copper spans in the loop, which meant maximizing switches. Since then, roles have reversed and switching is more expensive than transmission. And within switching, software has grown more complex and therefore more expensive than hardware.

MARKET DRYING UP?

Cost aside, the U.S. market for Class 5 switches already has dried up, and manufacturers rely on selling software upgrades, argues Tumolillo, Probe's senior vice president and chief operating officer. "That's their business," he says. "They sell switches for the purpose of selling software for about 20 years.

"There's not a lot of switches to be sold in the U.S. market," Tumolillo insists. "In terms of big new switch orders, there's none left in the U.S." He adds, "The hardware business in that regard is over." Furthermore, the report claims a "sizeable number" of Class 5 switches operate "well below their rated capacity," an assertion vendors contest.

Ask Eric Doggett, vice president-marketing for Nortel's public carrier networks, if he sees growth potential with new carriers, and he responds, "Yeah I do, because

continued on page **50**

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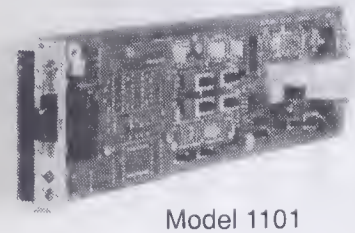
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Circle 136

SWITCHING

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we're actually selling to them." Nortel's business is particularly strong among alternative carriers overseas, though he says the company fully expects to sell to new U.S. carriers.

AT&T Network Systems is equally confident, says George Huensch, architecture director-global public networks. "As competition heats up, there will be, certainly in the next two to five years, additional Class 5 sales," he predicts. AT&T can accommodate new competitors starting small. "We've scaled our product line," he says. "It's very attractive in the small operations when you're starting up."

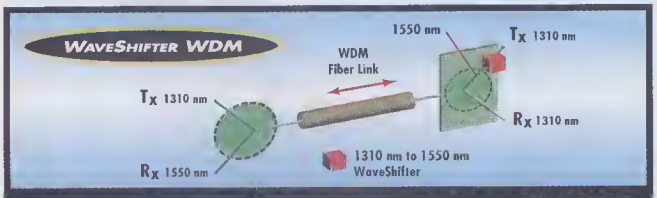
'BIG MONSTROSITY'

No one questions that network switching will continue to be more distributed, moving away from the "big monstrosity," as Tumolillo calls current switches. Servers cost one-eighth to one-tenth what switches run, so they can be replaced more frequently to keep pace with technology, he adds. Switch vendors respond that they're addressing the trend toward client/server and already are doing a better job staying abreast of technology advances.

CO switches are becoming more flexible, with software updates more frequent and less expensive, vendors maintain. Huensch calls AT&T's 5E10 software release, with its focus on advanced intelligent network (AIN) capabilities, the turning point. Carriers can expect "software coming out more regularly in smaller chunks," he says. "That's definitely the trend, and we're doing it."

Paul Carroll, director-strategic planning and analysis for Siemens Stromberg-Carlson, agrees upgrades are getting faster: "The days of 24 to 36 months to get a feature are history." Plus, AIN puts ser-

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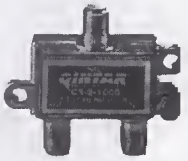
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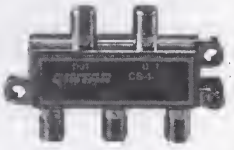
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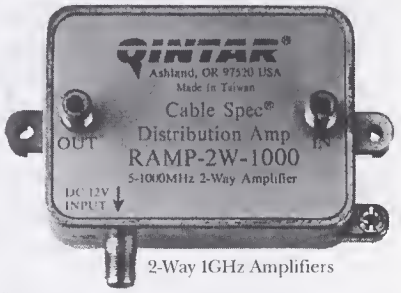
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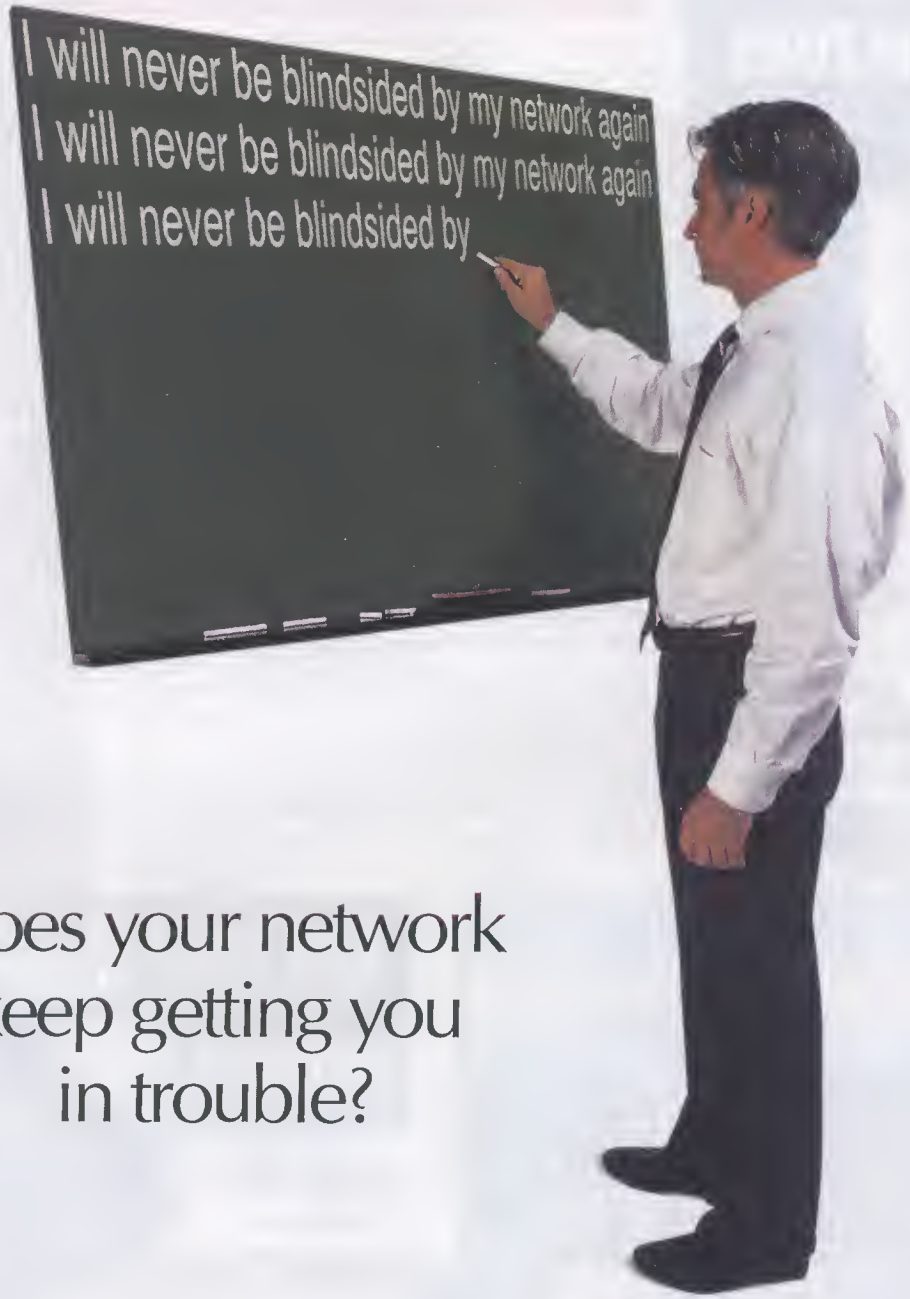
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Circle 137

SWITCHING

continued from page **50**

vice creation in the customer's hands, further broadening network capabilities.

Local loop switch functionality will continue to evolve as well, the vendors say. This development has been ongoing, Huensch maintains. If you look at the company's 5ESS line in the early '80s, "you'd hardly recognize it" compared with today's.

One trend: getting long distance traffic onto local switches, mirroring a combination many carriers will be peddling. Some of Nortel's DMS line combines local and toll traffic, and Siemens announced earlier this month that it will add full interexchange carrier tandem capability to its EWSD CO switching system

Even when major migrations toward ATM begin, elements likely will be shared. ATM won't replace narrowband voice, Huensch assures; rather, narrowband and broadband will converge. "Turns out, many of the components of those systems are shared elements." He expects to see the "guts of our Globeview [ATM] product" in the 5E, which can act as "voice server." The company already has ATM inside 5Es for CDMA applications, transporting voice packet cells over ATM: "We've already taken the first step."

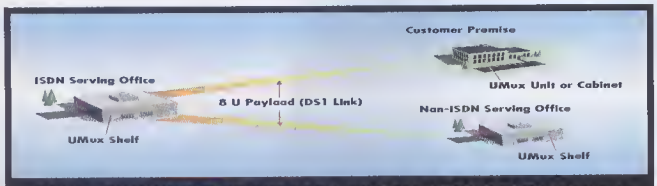
THE CLIENT/SERVER MODEL

Doggett foresees the future public network client/server model as access ring topologies being linked together with backbone broadband networks, with multiple servers hanging off: voice servers, video servers, etc.

"It'll basically be like a very large broadband ATM LAN with a variety of servers on it," he predicts. There'll be no more "monolithic switching network.

"That's the fallacy," Doggett continues.

continued on page **54**



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- 07 ☐ 7 Pacific Telesis
- 08 ☐ 12 Bell Communications Research
- 09 ☐ 20 GTE
- 10 ☐ 30 Independent Telephone Company

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Cable TV (CATV) System Operator
- 11 ☐ 50 MSO (Two or more Cable TV Systems)
- 12 ☐ 55 Independent Cable TV System
- 13 ☐ 60 Cable TV Contractor/Engineering Firm
- 14 ☐ 65 Other Cable

Wireless Operators
- 15 ☐ 190 Cellular Operator
- 16 ☐ 195 PCS/PCN Operator
- 17 ☐ 205 Other Wireless
- 18 ☐ **18D Long-distance/Interchange Carrier**
- 19 ☐ **185 Competitive Access Provider (CAP)**
- 20 ☐ **22D Telecommunications Reseller**
- 21 ☐ 170 Other Carrier
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- 23 ☐ 135 **CONSTRUCTION CONTRACTOR**
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- 29 ☐ 13 **Management** (VP, General Manager, System Manager, Manager, Director)
- 30 ☐ 3 **Corporate Management** (Chairman, Owner; President, Partner, Executive/Senior VP/Director, Treasurer, CFO, COO)
- 31 ☐ 4 **Legal, Financial, Regulatory or Processing Services** (Director or Manager of Rate Planning & Administration, Settlements & Contracts, Service Costs, Methods, EOP or IS Operations)
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- 33 ☐ 16 **Sales/Marketing** (Sales or Marketing VP, Director, Manager, Representative)
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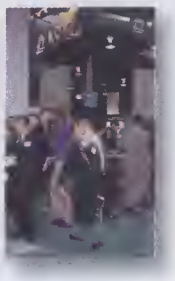


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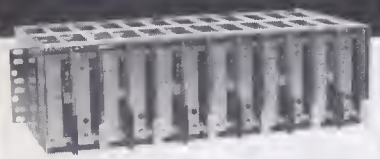
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Circle 138

SWITCHING

continued from page **52**

"It doesn't have to funnel through the switches." Switches will continue to evolve with more compact interfaces, supporting various distributions of services.

But even as switching grows more distributed, it's not just the investment in switches themselves that argues for incumbent LECs adapting—not abandoning—their current architecture, Carroll says. "The question of what size the switching nodes become is a question of how the individual service providers devise their outside plant architecture," he adds. "Moving to a very distributed architecture means redoing a lot of the outside plant architecture." That, Seigneur and Tumolillo argue, is exactly where the opportunity arises for new entrants.

Probe's report argues the switching market is vulnerable to invasion from computer companies selling to those new entrants, and eventually the incumbents. Tumolillo says his company has talked with several such firms and finds "a growing sense on their part" that they can break into telecom and that they are "very much interested in pursuing it." New applications are being developed on platforms separate from the switch, whose only application is real-time voice. "The question for these [computer] guys is, why do I want to always be the peripheral?"

MOVING TO OPEN SYSTEMS

The opening exists, according to the report, because proprietary switch processors "lag the speed and memory capacity of off-the-shelf servers," which switch manufacturers declined to use despite the boom in PCs and Unix RISC processors in the computer industry. By sticking with their proprietary systems, switch vendors have kept network costs needlessly high. The report claims: "While the cost to con-

continued on page **58**

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VIDEO SERVERS

SYSTEM PROMISES REAL-TIME VIDEO MAIL

Pac Bell and Whittaker claim a breakthrough

Mark Dziatkiewicz
Contributing Editor

Delivering video-based services poses technical and economic challenges. But real-time video streaming—at reasonable price points—is on the horizon for technology development partners Whittaker Corp. and Pacific Bell.

A joint "video mail" demonstration, incorporating Whittaker's video/multimedia server and Pacific Bell's ATM network, exemplifies real-time video storage and retrieval. The demonstration results from a collaboration agreement between the two companies for developing a real-time ATM video/multimedia server.

Video servers aren't new—every video-on-demand trial incorporates the technology. But economical two-way real-time video streaming is a breakthrough, according to James Schultz, director-business development for Simi Valley, Cal.-based Whittaker. "What makes this different is it's the only server that exists today that can do streaming of video over ATM—full duplex," he says. "That means no latency at all. It's high resolution and AL1 protocol on an ATM network."

Most video-on-demand applications require one-way video output only—pumping video into homes. And the video servers are far from off-the-shelf products. "They've built really specialized equipment for [VOD] applications," says Tom Soon, lead member-technical staff responsible for Pacific Bell's business broadband media lab. "In order to move technology and move the entire service concept forward, we need general-purpose storage and retrieval capability that I can hook up to any computer and offer directly through our broadband network environment."

Reliable, scalable real-time storage and retrieval and video streaming is a primary service objective for network operators participating in multimedia's information service future. But what that means varies by implementation.

"For real-time traffic storage and retrieval we have very few choices—this is a real-time video server," continues Soon. "Real time has a very precise technical



meaning; it's not just high speed. You can buy a commercial file server and put an ATM interface and call it a server," but it doesn't mean it's gong to work.

Soon claims current file servers can't support real-time features in a precise way with explicit latency guarantees. "They can burst a file to you, but when I watch a video I don't want it burst to me, I want it sent in a regulated manner," he says. If it isn't regulated, consumers see broken rather than smooth video. "Most conventional servers cannot do it. They can deliver a lot of data to you in a short period of time, but it won't help to see a smooth video. There is no commercial file server that can do real-time video storage and retrieval operations directly off ATM networks."



VIDEO MAIL - The Whittaker server.

It's why the jointly developed product, based on an earlier Whittaker Data Manager server, shows great promise. Pacific Bell provided network and technical specifications and co-wrote software, says Schultz. "We worked with them and collaborated to introduce this real-time capability into the file server and built the hardware," adds Soon.

Schultz predicts he'll have the best video server price points. "We anticipate under $1000 per stream when we have 96 ATM streams," he says. "The product can scale up to 500 streams or with product enhancements could be up to a couple thousand. As customer demands and partners see that need, we'll make those enhancements." Whittaker expects early 1996 delivery, selling or partnering with phone companies or selling to large enterprises.

The video mail demonstration incorporates traditional store-and-forward computer e-mail approaches. But potential applications extend farther.

"We're looking to create markets and business in electronic commerce," says Schultz. "And help targeted customers to do things better, thereby saving them money or giving them a competitive advantage." He sees the health care industry—already ATM experimenters—as a prime beneficiary.

Opportunities extend to broadcasting, retail, advertising, film, TV, post-production and more. "Video mail is one application we can support," says Soon. "But all components are focusing on providing real-time video output. It's direct ATM-based storage and retrieval. Combining these two we can support a number of multimedia applications over the next broadband network environment." ■



SWITCHING

continued from page **54**

vert switch software to open computer systems might have been high, the cost of maintaining and enhancing software in the limited confines of embedded processors has proven to be higher."

Lines of code and therefore complexity and cost could be reduced by moving to open systems, but Seigneur, a senior researcher at Probe, questions the industry's willingness to make the transition. "There's always been a cloud or a veil over telephony switching, like it's this kind of black art: Don't try this at home."

But switch manufacturers say they're behind open systems. Huensch says AT&T Network Systems is "big in [open systems]. As new standards develop, you're going to see more and more of that."

"We embrace the whole concept of open switching," agrees Nortel's Doggett. "We have from the beginning." Nortel has made "major investments" in switch-based software and call processing that "totally opens it up.

"The need for openness is absolutely there," he says. Like Huensch, however, he flags standards as the major inhibitor of open systems to date. "The standards always lag the rest of the world and they lag the competitive environment."

THERE'S ALWAYS BEEN A CLOUD OR A VEIL OVER TELEPHONY SWITCHING, LIKE IT'S THIS KIND OF BLACK ART: DON'T TRY THIS AT HOME

But the incentive to open up the network should grow stronger. Doggett notes open systems will be even more of an imperative in a competitive environment, when carriers likely will be looking to increase network usage, battling each other as wholesalers for large chunks of traffic.

Switch vendors recognize possible competition from computer companies. "I think certainly there is the potential" for computer companies to invade the public network switching market, Carroll says. He points to voice-over-Internet possibilities, noting, however, that key elements still are lacking, such as a method for mapping or interworking between the Net and the public switched network.

"Yes, there are alternatives, but I don't think they're ready for mass deployment yet," he says. Nortel's Doggett sees less of a role for computer companies in the core switching function than in applications development.

continued on page **60**

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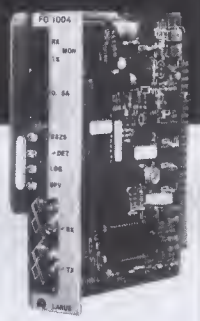
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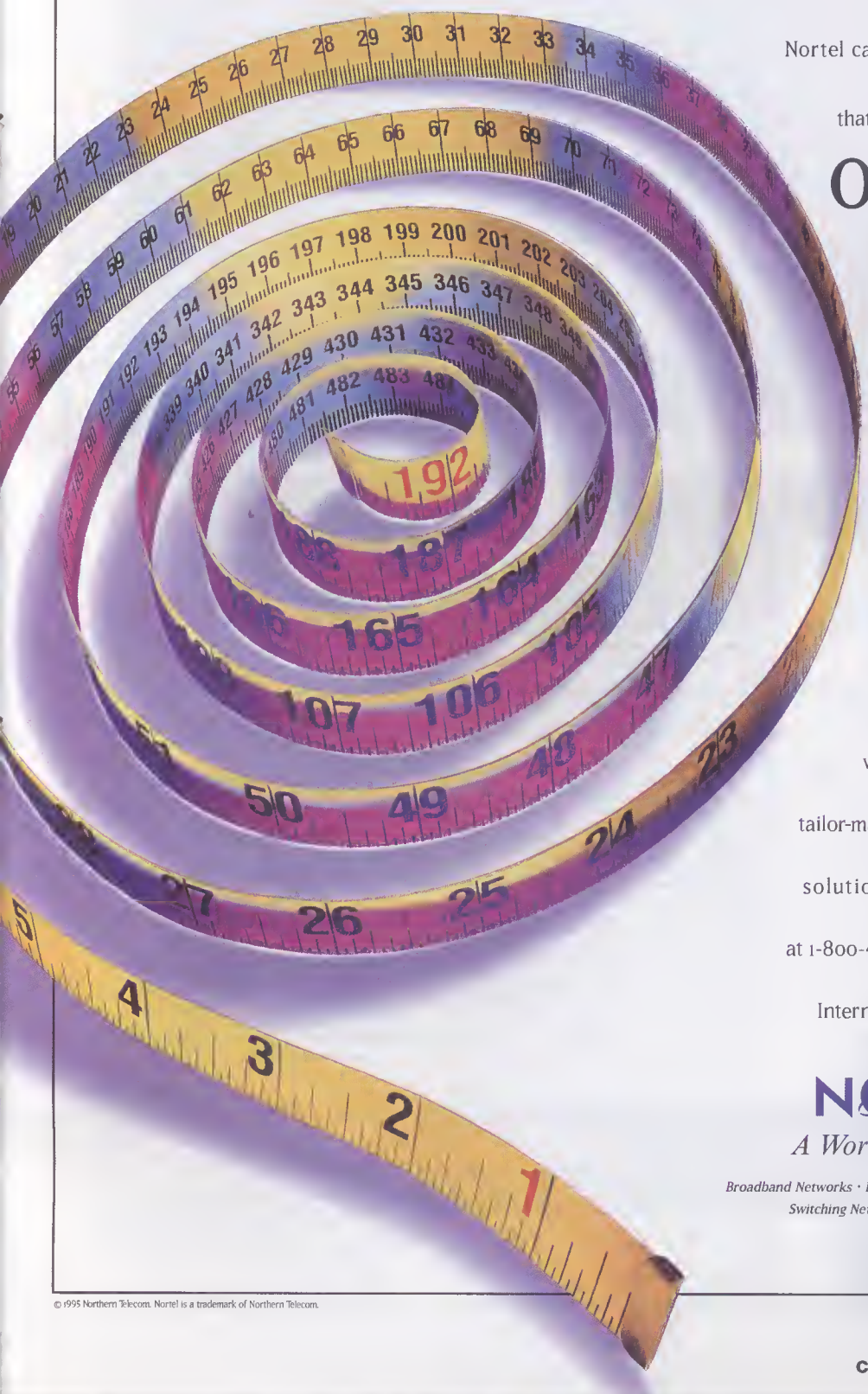
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Circle 108

SWITCHING

continued from page **58**

The ideal, according to Seigneur, would be a kind of network operating system for the whole Information Highway—"the Novell NetWare of the telecommunications world."

Switch vendors claim to have a similar goal. Carroll says switches may become more like "voice routers"—"voice servers" is another term that recurs among switch manufacturers—and the business may split naturally into two parts. "We move more into the operating system business, and as a separate business, we go into the application business." Siemens clearly will remain on both sides of that fence, he adds.

But does this model leave any room for the traditional big Class 5 switch? Tumolillo claims the big switch vendors will try to finesse the issue by simply renaming switches "servers." The vendors, in turn, revisit the mainframe analogy to show networks will need higher-capacity servers.

"In fact, mainframe sales are very robust," points out Siemens' Carroll. "Their function has changed and they've become the large back-office server." Switches can serve a similar function, he says.

Huensch rejects the mainframe analogy and says, "I see [the switch] as more of a voice server" than a mainframe. But he also notes client/server systems are causing higher demand and traffic on computer networks, requiring more powerful servers.

This certainly could happen in large public networks, he insists. "The pie's getting bigger at the same time." ■

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Nov. 16-17	Video Dialtane Summit	Washington DC	ANA Hatel	202-40B-000B
Nov. 2B-30	Wireless '95 Americo	Miomi FL	N/A	202-429-2031
Nov. 29-30	Survivol in Telecommunicotions Monogement	New York NY	Hatel Macklawe	B00-227-1234
Nov. 29-Dec. 1	Western Coble Show	Anaheim CA	Anaheim Canventian Center	510-42B-2225
Dec. 4-6	Implementing Local Exchange Campetitian	Woshington DC	Morriott Metro Center	B00-B22-633B
Dec. 4-6	North Dokota Association of Telephone Cooperotives Annual Meeting	Bismarck ND	Radissan Inn	202-29B-232B
Dec. 4-B	SUPERCDMPUTING '95	San Diega CA	Convention Center	619-534-5039
Dec. 5-B	Datobase & Client/Server World	Chicogo IL	Navy Pier	50B-470-3B70
Dec. 6-B	Multimedia CamFarum and TecFarums	Bal Harbaur FL	Sheroton Bol Horbour	312-938-3500
Dec. 12-13	Bar Cade Salutians and Strategies Seminar	Chicago IL	Romodo O'Hore	800-733-7592
Jan. S-8	Consumer Electranics Shaw	Las Vegas NV	N/A	202-457-B700
Jon. B-10	SCTE Conference an Emerging Technolagies	Son Francisco CA	N/A	610-363-6BBB
Jan. 11-12	NECA Baard Meeting	Drlanda FL	N/A	202-298-2328
Jan. 14-18	18th Annual Pacific Telecammunicatians Canference	Hanalulu HI	Sheroton Waikiki	80B-941-37B9
Jan. 15-1B	BICSI Winter Canference	Drlondo FL	N/A	B00-242-7405
Jan. 16-1B	CDMDEX/PocRim	Vancauver BC	N/A	617-449-6600
Jon. 17-19	Universol Service '96	Woshington DC	Embassy Suites	B00-B22-633B
Jon. 21-25	Alasko Telephone Associotion Winter Conference	Kameau HI	Hiltan Waikoloo	907-563-4000
Jan. 22-24	Technalagy Farecasting far the Telecam Industry	Austin TX	Stauffer Hatel	213-436-0314
Jon. 22-27	DPASTCD Winter Convention	Marco Island FL	Marriatt Hatel	202-29B-232B
Jan. 24-26	AFCEA Western Canference	San Diega CA	N/A	703-631-6200
Jan. 24-26	MexCam '96	Mexico City, Mexico	N/A	305-670-9444
Jan. 29-Feb. 1	Communicotions Network '96	Washingtan DC	N/A	617-769-B950
Jan. 30-Feb. 1	Telecam Resellers Associatian Canference	Huntingtan Beach CA	N/A	703-734-1225
Feb. 4-8	NTCA Annuol Meeting & Expa	New Drleons LA	Marriatt	202-29B-2320
Feb. 5-7	1996 Cammunicatians Business & Finance Canference	New York NY	Sheratan Tawers	B00-822-633B
Feb. 5-9	NIUF: North Americon ISDN Users Farum	Gaithersburg MD	N/A	301-975-4B53
Feb. 12-15	Western Camm Farum	Dallos TX	Grand Kempinski	312-93B-3500
Feb. 14-16	Louisiono Telephone Associotion Annuol Conventian	New Drleans LA	N/A	504-927-1377
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Feb. 27-March 1	CDMDEX/Cam-Expa Mexico	Mexico City, Mexica	N/A	617-449-6600
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March 12-14	Camputer-Telephony Conference/Expo	Los Angeles CA	Canventian Center	212-691-B21S
Morch 13-15	Intercom '96	Miami FL	Florido Internotionol University	305-670-9444
Morch 14-20	CeBIT '96 Honnover	Hannaver, Germany	N/A	609-987-1202
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March 25-27	Wireless '96	Dallas TX	Canventian Center	202-463-7905
April 2-3	Narth Dakata Telephane Assaciatian Annual Meeting	Bismarck ND	Radissan Inn	701-223-6022
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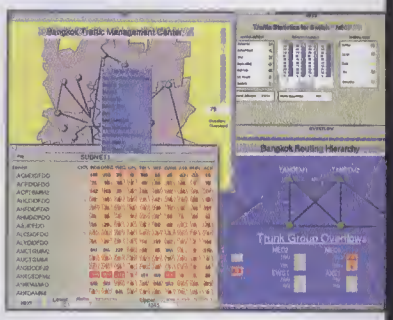
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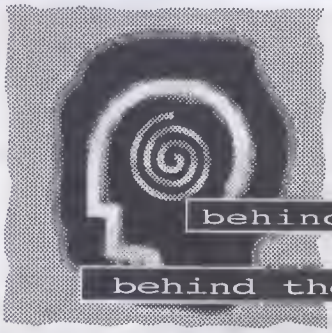
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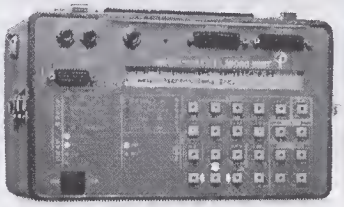
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TIME TO TAKE RISKS AND MEET COMPETITIVE CHALLENGES

Gary Kim, Contributing Editor

Despite brave—even militant—talk from public network and cable TV companies about meeting the challenges of a competitive marketplace, two problems prevent many of those organizations from taking the bold steps required to ensure success over the next few decades.

For starters, the broad rank and file often seems either oblivious to the nascent danger (and opportunity), or is in a state of denial. To be sure, AT&T, for example, has made significant strides lately, halting and then reversing a slide in long distance market share.

The company's recent restructuring plan will help stem, but likely cannot prevent, a long-term market share decline from 60% down to the 30% range, as the regional Bell operating companies move to claim a serious share of the business and merge with leading interexchange carriers to accomplish that goal. How many AT&T associates seriously are planning for the implications of those seismic shifts?

Likewise, how many executives within cable TV companies are budgeting for an eventual loss of 20% of their existing customers? How many "pure" cable companies (those not hedged by significant ownership of programming, alternative delivery and telecommunications assets) can afford to see basic cable penetration back down from 70% to 50% before they have to hand over the keys to the bank?

Crowd in the Sandbox

Ask TCI executives what has happened in Hartford, Conn., where a rival Southern New England Telephone video offering has stolen as many as 30% of existing TCI customers.

POACHING CUSTOMERS

And though they might like to weigh the findings with caution, how many cable TV executives can take any comfort from the results of a recent Yankee Group survey indicating that 90% of U.S. cable TV customers might be willing to switch providers for a 10% to 15% discount? Though actual behavior might not approach that level, ask TCI executives what has happened in Hartford, Conn., where a rival Southern New England Telephone video offering has stolen as many as 30% of existing TCI customers.

Conversely, which RBOC managements are prepared to explain to investors why dividend payout ratios must decline sharply, if not cease, if future asset value is to be grown? If such painful decisions are not made, where will the free cash flow come from to fund massive investments in wireless, electronic commerce, enhanced services and long distance?

That investment will be warranted by the encroachment of competitors such as Time Warner, which appears to be snagging as many as three out of 10 new cellular customers in Rochester, N.Y. And in the UK, where cable TV companies are encouraged to provide dialtone, telephony revenues sometimes run ahead of video revenues. There, a 20% premium for adding telephony capability to the network results in as much as a 50% increase in revenue.

MORE THAN MARKET SHARE

And, as Pacific Telesis appears to have discovered in California, the real danger is not lost market share, but the impact on unit pricing. Early in 1995, the California Public Utilities Commission opened up the intraLATA long distance market to competition. During the first quarter of 1995, intraLATA long distance revenue may have dropped as much as 36%. By the end of 1995, the revenue contribution from this source may drop from the 1994 level of 21% of total Pacific Telesis revenues to about 15%.

Most dangerous, the company may have made overall rate reductions of 40% to meet competitor pricing. So less money is made on each unit of that type sold.

The other, equally difficult problem, is that many significant telecom organizations appear to have little strategy other than positioning assets for sale. Though that may be a responsible way to maximize shareholder value, it does not help those who will continue to be stewards of their companies long into the future, and who will be left holding the bag once the asset shuffling is finished.

Denial is not healthy. The world as we know it is going to be replaced by a market-driven, customer-ruled environment where we cannot wait for perfect knowledge before moving.

Reasonable risks must be taken, even in advance of a stable plan, because the environment is unstable and becoming more so. Flexibility is important, but so is transformation. Get on with it. ■

Gary Kim is a contributing editor to America's Network *and vice president of Probe Research, Littleton, Colo.*

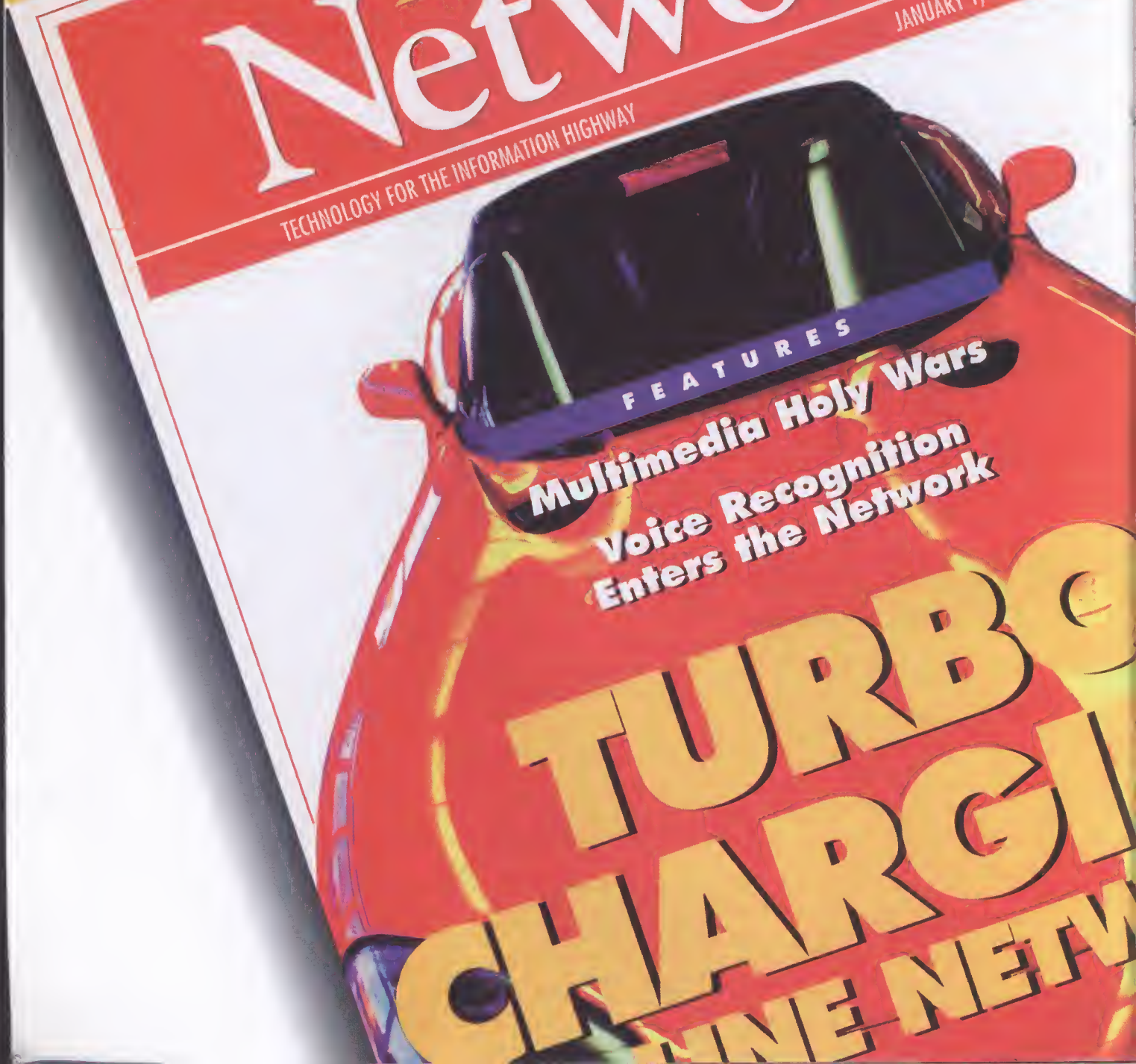
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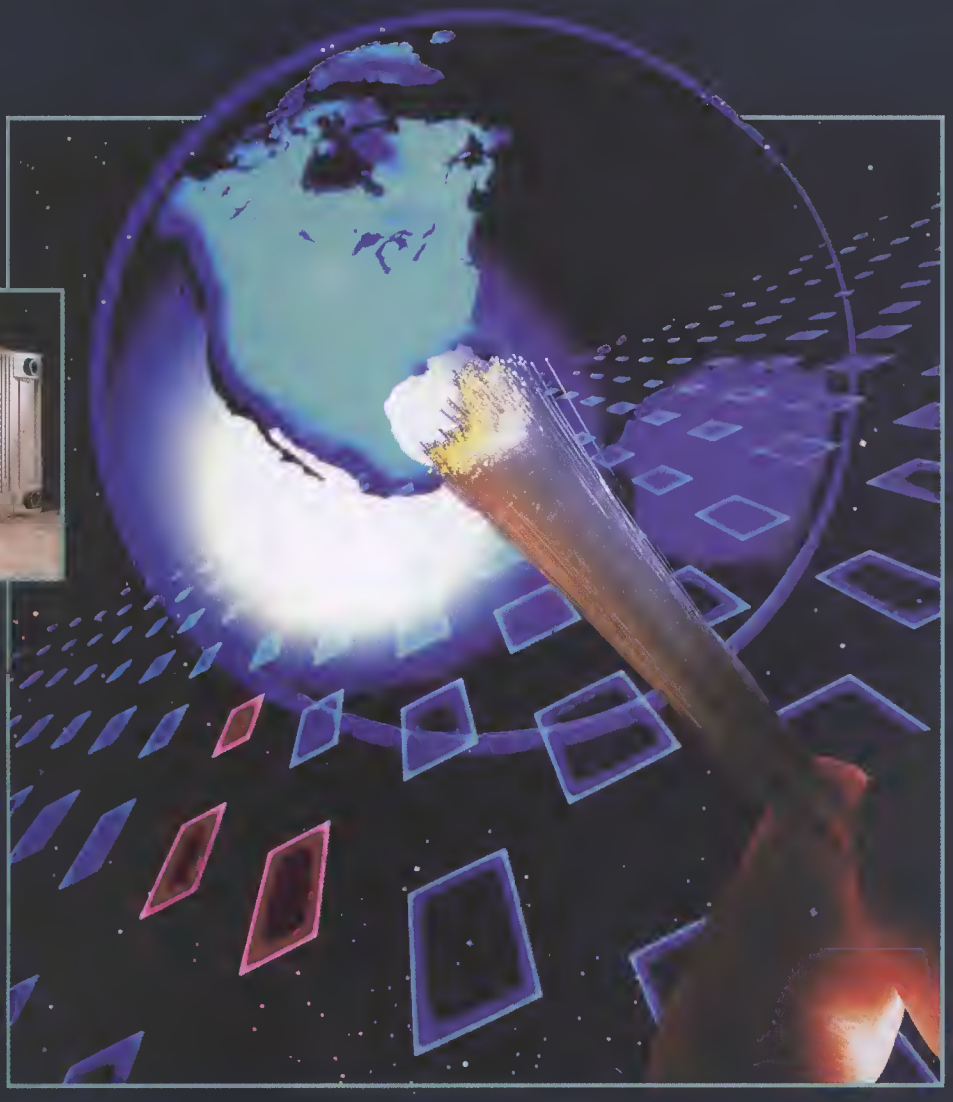
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